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GITTINGS

TUBERCULOSIS IN CHILDREN

Based on lectures given post-graduate men in Philadelphia for the last several years, this book is intensely practical, concise, usable and does not re-cover the ground given in books treating this subject in the adult, but is devoted to the peculiarities of the disease in children alone.

CUMSTON-PATRY

STOMACH

**THE SURGICAL TREATMENT OF THE
NON-MALIGNANT AFFECTIONS OF**

This book represents the combined experience of American surgeon versed in Continental methods and continental surgeon fully conversant with Anglo-Saxon methods. It treats those questions that are interesting to both physicians and surgeons, being, in fact, a medico surgical monograph on the subject which, Sir Berkeley Moynihan states in his introduction, is a very necessary book.

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Vcl. XII

TORONTO. JUNE, 1922

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THE BROADENING SCOPE OF MENTAL MEDICINE*

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PERHAPS the outstanding characteristic of our time is its uncertainty. We look about us at a world in flux—a world that seems immersed in a queer mixture of radicalism and conservatism. We bravely assume an outward mien of equanimity, although within us our hearts are oppressed with foreboding. Unrest, distrust and discontent like birds of ill omen fly heavily back and forth across our outlook. Like the dense growth of a jungle the complexities of our life rise about us, and each day's sun instead of bringing us nearer that blessed day when all things shall be as they should be, brings us face to face with new difficulties and new confusions. It is as if we stood upon a road, ribbed by light and shadow and passing but a short distance ahead into a dense fog of uncertainty. Man hates uncertainty. He is prone to people the future with the pleasant or with the terrifying phantasies of dreams.

But in this Time, new forces rise; old forces take on sinister aspects or set themselves to oppose the new. Where all this may end we know not, but a measure of consolation comes to us when we consider that change is eternal and that after all it is the survival of upheavals; the steady progress onward that stamps man as great; this, rather than the making of many machines and the building of cities, for we do remember that iron rusts and strong granite crumbles into dust. And with our peace disturbed we must needs find a reason, and, forsooth, we have no difficulty in finding many reasons. One blames war, another governments, another lack of faith, and so on.

*Delivered at the Ontario Neuro-Psychiatric Meeting, Toronto, Ont., February 20th, 1922.

But perhaps in our looking abroad for some mighty influence we have not paid sufficient attention to the tendencies and characteristics of the individual man. He is the unit of which human society is built. His life is lived not unto himself alone; it has its influence on all about him and is in turn played upon and moulded by myriad influences from without. "I am a part of all that I have met." Great world movements seeming to originate in the minds of a few, owe their progress to the united minds of all who participate, and this is true whether the ultimate goal be good or evil. Great universal forces such as religion, law, literature, have not sufficed to prevent catastrophes. Perhaps we shall get along better when we know more about man himself. And the striving for this knowledge constitutes one of the grounds of endeavour of those interested in mental medicine; a study of the whole man, body and mind; a bringing to the light of day the motives that control his conduct, a tracing of the multitudinous relationships which intangible, yet bind him as with bands of steel to his environment.

From the time when the first living creature appeared in the primordial ooze, there has been a fierce struggle for existence. Among lower forms of life different methods of perpetuating species have been tried; with some, the method of profligate propagation, in the dim hope that of the myriads brought into life, a fair number would survive its vicissitudes and continue the species. Others have met the struggle by the development of protective structures such as shells, horns, claws, etc. Man perhaps owed his premier position among the forms of life to the fact that down

through the ages he has never been led away from the development of a nervous system and intelligence. (1)

And in the ten thousand years that man has existed, he himself has had fierce difficulties with which to contend. The individual urge has at all times been curbed and restrained by the demands of the herd. The long years, yes, centuries of struggle toward stable government and stable living conditions, are the best witnesses of the bitterness of the struggle between individual and group aspirations. To-day in most parts of the world, the struggle has in many ways come to a termination. The will of the herd, as expressed in organized government and society, has triumphed, but individual aspirations are by no means destroyed. We are faced with the necessity of studying them carefully for they contain somewhat of both good and evil.

And we face a serious difficulty right at the beginning. In the process of establishing society someone, somewhere put forth the dictum that all men are equal. It was seized upon, passed from mouth to mouth; again and again it has been the war cry of the multitude. To-day it constitutes the *raison d'être* of those who burn incense at the shrine of that shifty God, Democracy. But can it be that all men are created equal? Just one moment's thought and we are satisfied that they are not and never can be equal, and could the facts of individual existence each day be fully and plainly recorded, they would abundantly bear witness to this fact.

Intelligence is not equally and uniformly distributed. We are aware of differences in the emotional and volitional capacities of those about us and ourselves. But these differences, important as they are, are difficult to evaluate. On the other hand, we have at our command the means of establishing, with a fair chance of accuracy, the degree of development of intelligence. The wide-spread application of tests of intelligence has revealed a perfectly astounding variation in individual intellects. And, now that we know of these variations, we are seeing explanations for some at least of the problems that have puzzled society for years. We recognize that there are grades of defective intelligence that are not accompanied by the physical characteristics that rendered the recognition of the idiot and the imbecile an easy matter. And further, we find that it is this type of mentally defective individual that, while passing heretofore as a normal person, has been causing some at least

of the unexplained things that appeared to be serious defects in the social organization. The child comely in appearance but backward at school; the man whose economic life is marked by continual failure; the individual, who in spite of retributive justice, commits the same crime again and again; all these stand, not as examples of social injustice and lack of opportunity but as cases of inadequate personal endowment and development.

The medical profession cannot but be vitally interested in all this. We must know how to recognize these people. We must provide institutions where the more grossly incapable shall be comfortably cared for. We must bend our energies to the discovery and prevention of the causes of inferior intellectual development. At present we do little; the feeble-minded without stay or hindrance enter into the life of the community, attempt to assume responsibilities they are in no whit capable of assuming, bring children into the world in about twice the proportion that normal people do and children, moreover, who twice out of three times are as defective or worse than the parents themselves.

With all the variation that we know to exist among individuals, we continue to proclaim a doctrine of equality, and in practice instead of recognizing and dealing with individual variations, we attempt to bring all to a dead level of uniformity. And, if one may judge present tendencies, the level of uniformity is not high but rather one of ghastly mediocrity.

There will always be an irreducible minimum of mental defect, since always there are going to be brains damaged by the accidents of childbirth or the infectious diseases of early life. But what we must recognize and prevent in so far as we are able, is the unnecessary increment in mental defect due to such things as alcohol, syphilis or feeble-mindedness in the parents.

And what shall we say of mental disease? It seems passing strange that the interest in mental health is of such comparatively recent development. No doubt this is in part due to a wide-spread belief in the essential separateness of mind and body. Man has been curious about the structure and functions of his body, but his study of mind, for countless years has been a poor puny thing. Psychology has distinctly been of the "rose water" variety. Wheeler (2) aptly says, that to a chance visitor from Mars, most psychologies would read as if they had been composed by beings that had been born and bred in

a belfry, castrated in early infancy and fed continually for fifty years through a tube with a stream of liquid nutriment of constant chemical composition. Whether we agree or not, and most of us would agree, we will at least admit that our approach to the study of mental life has been a very halting movement, held back by a variety of influences among which fear of the unknown and ecclesiastical propaganda have not been entirely inactive. It has been this lack of knowledge of mind, this diffidence to inquire, this "unwillingness to face the ethically and aesthetically unpleasant" that has been responsible for the gross indifference exhibited toward mental disease by the public, by governments and by all but a mere fraction of the medical profession itself. Those sick in body have received much attention. Those afflicted in mind have, until recently, had naught to look forward to but confinement in barrack-like institutions, poorly equipped and poorly manned. Here they have been placed where eye might not see, nor ear hear. Here the minimum of food and shelter has been provided. Rarely, until of late, has any effort been made to solve the problems presented by each individual case. Treatment of mental disease compared with treatment of physical disease has been a marasmic child kept from becoming the force for good that it might be by the indifference of governments, public and profession alike. But within the past few years we have seen signs of a change, an interest has appeared. It is for us to say whether that interest shall continue to live and grow or whether it shall again fade till it resembles nothing so much as the uncertainty of a dream. We will not be satisfied until the care and treatment of mental disease stands on an equal plane with that accorded physical disease. We shall go further; we shall say that we will not be satisfied until the essential relationships between physical and mental disease are so well recognized that nothing short of the best possible care for both will be accepted by profession or public. We must get away from the idea that psychiatry is an isolated subject. It in its fulness demands all that there is in medicine; hospitals for mental disease must not be highly specialized institutions; they must indeed be highly generalized.

For the sceptics who feel that effort toward the alleviation of mental disorder is futile, I may state in passing that our experience in the Manitoba Psychopathic Hospital has revealed something vastly different. During the two years of its

operation, an average of a little over one-third have had to be committed to a Provincial Hospital. Approximately two-thirds have returned to the community, not all cured but restored to a reasonable or better degree of usefulness. We are assured that a hospital where mental disease may be studied completely, where concurrent and contributing bodily disease may be treated and where, most of all, *early* attention is available, is one proven stronghold against the battalions of the "Kingdom of Evil."

Then there is the great field of relationship between crime and abnormal mental states. Crime, we have no doubt, is as old as mankind. Primitive man, we may imagine, was governed in his life by instincts unrestricted at first by law or custom. In his communities, for in him the herd instinct was as active as in other mammals, customs developed and these recognized finally by the community, formed the basis of law. No doubt the rights of the individual and of the community at times were set at naught by certain individuals and in such cases justice took the form of undisguised retribution. An eye for an eye and a tooth for a tooth represented the extremely practical form of treatment meted out to the wrong doer, not by the community, but by his outraged and exasperated victim. Such a system of dispensing justice often enough resulted, we may suppose, not only in a balancing of accounts but in a fresh state of unbalance in which the relative positions of wrong doer and victim were simply transposed, and this only because the treatment was bound to be thorough and the rates of exaction about two teeth for one. As this process went on, the attention and sympathies of others were attracted, family and community feuds arose and soon reached the proportions of civil war with all its melancholy entail of blasted lives and happiness.

With the object of limiting the length to which personal retribution could be carried, the state gradually took the matter into its own hands, so that for hundreds of years now it has, through its established institutions, drawn up and enlarged a criminal code, apprehended law breakers, and these when found guilty it has uniformly locked up, a few to be helped thereby, many to receive no benefit and some to be actually harmed. The law has not been able to explain how so many law breakers fail to benefit from the treatment dealt out to them. Public revenge, the idea of deterring others who might follow similar courses, even the idea of reform as held by the authorities

of some penal institutions, these have no appeal to the individual who through inherent improvidence, complete lack of appreciation of the rights of others and absolute inability to profit or be guided by experience, commits one depredation after another on society, and is punished each time by the regulation imprisonment for some months. We are not worried about the occasional criminal; he accepts and is probably benefitted by punishment; but we have a very definite interest in the type of humanity known as 'habitual criminals'. It is in the treatment of these that psychiatrists believe the present system reveals its weaknesses.

Criminologists from Lombroso onward have sought for explanations. The present view is that anti-social behaviour is a reaction to a great many influences both intrinsic and extrinsic. It seems possible that the law with its tendency to formulate and pigeonhole, has failed to adequately meet the problem of criminality simply because in its careful weighing of crime and punishment it has been impersonal instead of personal. In its enthusiasm to hang the wrong doing on some peg in the criminal code, it has lost sight of the wrong-doer. It seems that social defence and individual re-adjustment which after all must be the basis of law administration, can only be attained when not only crime and punishment are thought of, but when, in addition, the criminal himself is appraised as to his personal makeup. Only in this way can treatment be suited to the case in hand. One would be sceptical of the physician who sent his patient to hospital for a definite number of days and then discharged him regardless of the nature and status of his malady. Should we not be equally sceptical of the business of locking up and releasing wrong-doers while blissfully ignorant of the nature and future possibilities of the individual so dealt with?

So far the chief work of medicine in dealing with crime has been in connection with Juvenile Courts. In Manitoba, where, by the way, the first juvenile court in Canada was established, there is a psychopathic department in the Court. To this the judge refers such cases as appear to him abnormal, and all cases in which repetition of the same offence seems to indicate the presence of an abnormal trend. The report to him embodies reports on physical examination, family and personal history, school progress, social and economic reactions and psychological examination. From such a longitudinal section on that child's life, throwing light on the "multiple de-

termination" of delinquency, the judge arrives at his decision. More and more is similar work being done in the Superior Courts where the crimes are more serious and the offenders, adults.

When we come to the consideration of industry, we are obliged to admit that the attempts of psychologists and psychiatrists to elucidate the problems of industry have so far resulted in more gain for psychology than for industry. (3) The application of mental science to industry is but in its infancy. The object in view is to show how the laws of human behaviour may be exploited to advantage; to show that with the difficulties of management and the healthy aspirations of labour considered, much can be done toward the elimination of waste not only of material but what is more important, of human energy, which, when misdirected, might almost better be lost. The number of square pegs in round holes ought by this means, to be diminished, individual aspirations come nearer to their fruition and many of the grounds for misunderstanding done away with. One would not for one moment suggest that all industrial ills have defective, poorly balanced and unhappy states of mind as their initiating factor. What one would contend is that they play a part and that many of the involved situations they engender might be prevented.

"Every individual by his behaviour exerts some influence upon those with whom he is associated and this influence is either beneficial or the reverse. If we are to define what is meant by a normal personality, we can only do so in terms of his behaviour or reaction to life. That man is normal whose conduct is on the main creative, helpful to others and productive of useful social results. In contrast to this the conduct of the moron, inadequate personality, misfit, crank and neurotic is ineffective, obstructive, futile and non-productive. And the results of such ineffectual reactions to life are not confined to the abnormal person but exert a widespread influence upon the actions, happiness and mental attitude of others." (4)

And so we are sure that the psychiatrist has an outlook upon, and is in close contact with some of the vital social problems of the day.

We need do no more, scarcely, than mention the field for mental medicine in connection with schools and child-life generally. Apart from the need for clearer recognition of individual intelligence variations and the suiting of school work to these, we have much to learn concern-

ing the rate and progress of mental development. We have known for a long time that physical development of organs and body parts does not go on uniformly throughout the whole organism and experience indicates that mental development goes on in much the same irregular fashion. School authorities know little about this, but it is most important that they should know a great deal. The problem of the emotionally abnormal child can only be met by medical investigation and care. The present school curriculum is an inelastic thing founded on the belief, apparently, that children, like most other things nowadays, are standardized, and are capable one and all of undergoing a standardized training for life. There must be a return to individualization and the only way in which this can be accomplished is by making an inventory of mental capacities and attributes as important a thing as the inventory of body mechanics that has for a considerable time now held so thoroughly the attention of public and educationalists alike.

And now at long last we approach the question of the relationship of mental medicine to the rest of medical art and science. In the past decade medicine has approached its nearest to the status of an exact science; exact in the sense that we have been taught and expected to find for each ill a specific cause and structural change; so exact that in a sense we have almost got to the place where we view our patients from a sort of diagnostic eyrie located in a pathological laboratory. While mindful of the benefits bestowed upon us by laboratory medicine, one feels that this tendency has been fruitful of many pernicious results. In a large degree it has been fatal to that integrated view of the sick individual that reveals him not as a diseased gall bladder, decompensating heart and what not, but as a maimed organism. True, a body marked by the onslaught of disease in tangible form, but, in addition, a delicate intangible something through which each material catastrophe echoes and reverberates, disturbing in we know not how serious a degree the delicate balance between part and part and between organism and environment. In its frantic search for altered secretion and deformed tissue cell, medicine has forgotten and continues to forget that there is an art as well as a science of medicine. The masters of effrontery who with consummate brazenness hawk their wares before a gullible public, have not been so slow to discover that the sick man is desperately in need of sympathy and reassurance and this they give

him in large doses accompanied by some impressive form of manipulation. One feels that the exuberant growth of pseudo medical sects at the present day points definitely to one thing at least and that is a neglect on the part of medicine itself to provide for distress of mind as well as disease of body.

Mental Medicine has probably gone to the other extreme and in its belief in the separateness of mind and body, it has not only disdained to look for alterations in bodily function and structure, it has actually allowed itself to be almost completely isolated from medicine itself. Specialization is right and proper to a certain point; in this way advance is made; but as Cushing (5) says it is possible for a specialty to get split off permanently from the sphere in which it originated. "It becomes an isolated body revolving in a narrow orbit around its own subject from which it ultimately ceases to draw much light or heat. For when a specialty gets very far removed from greater medicine, no matter how bright its original flame, it rapidly cools to the loss no doubt of both medicine and specialty." Mental medicine has this to learn, that it is in reality part of medicine; no doubt the most generalized of all medical specialties but part of medicine nevertheless. Furthermore it must needs remember that bodily malfunction is by no means a negligible factor in the production and continuance of mental disorder, and knowing this it must be prepared to take the broadest possible view of the distresses and discomforts of all those who seek its aid. General Medicine in turn must recognize an essential kinship with Mental Medicine. It must learn to view sick people with an understanding mind delicately attuned to catch not only the faint swish of blood past a damaged heart valve, the delicate reaction in a test tube, but also the apprehension, fear and distrust that torment the mind.

"Canst thou not minister to a mind diseased
Pluck from the memory the rooted sorrow
Raze out the written troubles of the brain
And with some sweet oblivious antidote
Cleanse the stuffed bosom of the perilous stuff
That weighs upon the heart."

Students who now hear nothing of the part that personality plays in disease must be taught to scan their patients' lives for that abnormal sensitiveness and that emotional instability that play no slight part in painting the disease picture. Their question must be not—"What is happening to this man's heart, lungs or kidneys" but—"What is this individual trying to do? Has he

actual solid pathology that will account for all his complaints? Has he no solid pathology at all or has he a moiety of structural and functional change nestling in the midst of a large cloud of abnormal mental reaction?"

Of the physician's own personality we need only say that there is no single factor that speaks louder for success or failure in medicine than the possession or lack of "that which inspires faith in a sick man, who, as he lies a crumpled wreck, longs for the kindling spark of happiness, the ray of hope to light his darkness." He who would be a psychiatrist must also be a physician and in very truth he who would be a physician must ever and always be something of a psychiatrist. And so day by day physicians practising their art with steadfastness, with inexhaustible hope and inflexible resolution, may know that while much is known, much remains to be known. They may well pray that they live "not as fools and fine gentlemen, not beaten by the muddle, but like good fellows trying by some dim candle light to set their workshop ready against to-morrow's daylight."

It seems to me that mental medicine gives a scope that demands our most serious efforts. We are not, I trust, among those who fold their arms and settle all problems by some simple and all embracing formula, nor are we to be numbered among those who, terrified by the growing complexity of their problems, abandon themselves to the narcotic dreams of mysticism. We would fain stand among those, who, realizing the values and aims of the art and science of medicine, know full well that each increase of knowledge but in-

creases our contacts with the Unknown, (6) "that untravelled world whose margin fades forever and forever as I move." To us is given the task of unravelling the tangled skein of human behaviour benign and otherwise and as we search for motives and mechanism; we are inspired by that which seems to indicate a lofty and glorious destiny. We must not be dismayed when under the surface of our much vaunted intellectual idealism, under all of our most intense self satisfactions, we find nestling, the primitive. When we recognize that it is still with us, we shall understand conduct better and shall be less chagrined when our carefully raised social regulations at times give way with a rush. Of a surety, this we do well to remember that—"Out of wild nature we are come, that our instincts are great and our wisdom little, that the main current of our will is still like the green moving waters and our reasoned choices like the flutter of foam on its surface, that we became citizens but yesterday and were bred in the wilderness." (7)

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- (7) Carved, by some unknown person, on a rock in the grounds of Culver Military Academy, Culver, Indiana.

Snow Blindness.—Light which contains an excess of ultra-violet rays is more irritating to the eyes than light consisting of visible light rays only, and naked arc lamps, when being tested photometrically, produce definite pathologic effects on the eyes of those carrying out the experiments and exposed to their influence. The ultra-violet rays are of intense chemical activity, and it is these rays which produce the symptoms associated with electric light conjunctivitis, either by stimulating the nerve ends in the conjunctiva or

by some direct chemical irritation of that membrane. The consensus of opinion would indicate that in electric light we have an illumination that is capable of greater injury to the eye than gas, and very much greater than that of an oil lamp. In incandescent lamps used for house-illumination there is an irritating effect from long-continued exposure to the visible chemical rays. An oil lamp is less rich in actinic rays and gives a yellower and softer light.—A. W. Ormond, *Guy's Hospital Reports*, 71 : 195, April, 1921.

SYMPTOMS IN DIAGNOSIS OF PULMONARY TUBERCULOSIS*

J. H. ELLIOTT, M.B.

Toronto

THE examination of any patient will naturally begin with a statement of the symptoms for which he presents himself, not only those now complained of but those which are elicited from him as being present but which he may not have noted or failed to consider of importance. Past symptoms of disease are also of importance and have been discussed under the heading of history which must concern all variations in health in the past.

Nor must we expect to find in any one case all the symptoms which may be present, and which are usually considered as suggestive of the presence of tuberculosis. One or many of these may be absent, for as the clinical course of the disease varies from a rapid acute process, to one covering many years of a human life, so the symptoms vary in different cases, and in the same case at different times. At one extreme stands the case with closed foci in the lung which never set up symptoms and near this the one with a series of minor symptoms of ill health, not definitely pointing to tuberculosis. At the other extreme is the case where all recognized symptoms of the fully developed disease may be present. Between these extremes are cases in which a single symptom is outstanding, or a combination of any two or three or more of these.

In diagnosis of tuberculosis of the lung we may place our symptoms in two classes. (1) Disturbances due to the toxins of tuberculosis, i.e. constitutional disturbances as apart from (2) local or focal symptoms arising from the presence of disease in the respiratory system itself.

No single symptom is in itself sufficient to warrant a diagnosis of pulmonary tuberculosis.

CONSTITUTIONAL DISTURBANCES

Among the more important of these which we shall discuss are,

*Being part of a Symposium on the Diagnosis of Pulmonary Tuberculosis. Other papers will appear in next issue.

(1) *Fever*. Most cases will show at some time more or less irregular rises of temperature with the maximum usually between 4 and 6 p.m. It is increased by exercise and if rectal temperatures are observed it rises higher and does not fall as rapidly as does that following exercise in healthy persons. Frequent rises of the mouth temperature to 99.3 or 99.5 during rest, must be regarded as fever. For accurate observations, the three minute thermometer must be kept in the closed mouth for at least five minutes, and the one minute or half minute thermometer for a full three minutes. Do not forget that on a cold day the temperature taken by the mouth is rarely registered accurately if the patient has just come into the office. The slight normal rise after meals may be increased in tuberculosis, and the morning temperature which is usually below 98 in health may be 98 or over in the presence of a tuberculosis. So also the pre-menstrual rise frequently noted in health may be accentuated and some show an intermenstrual rise.

(2) *Loss in Weight*, gradually progressive, with no apparent reason, particularly in a young person, at once suggests tuberculosis.

(3) *Fatigue* is a symptom which is usually but not always associated with loss of weight. General lassitude or the complaint of becoming tired before the day is over may or may not be associated with tuberculosis.

(4) *Circulatory disturbances*, e.g. (a) increased pulse rate at rest. This associated with other symptoms here recorded is suggestive.

(b) Pallor and malar flush may be both present, or either alone. "Every girl or young woman who has neither genuine chlorosis, Bright's disease nor syphilitic anemia, but has the appearance of chloro-anemia, must be suspected of having tuberculosis." (Dieulafoy)

(c) The blood pressure is usually low, returning to normal with improvement in health.

(d) Blood changes are not marked in the early stages, and the haemoglobin is most affected.

(5) Gastrointestinal disturbances may overshadow the pulmonary symptoms in the early stages. Anorexia is common or the appetite may be variable. Irregular constipation is the rule rather than the exception. Occasional attacks of diarrhoea may be present without ulcerative disease of the bowel. The gastric juice may be inefficient because of hypo-secretion. Indigestion occurring in a person previously free, associated with malaise, loss of weight and cough makes a careful pulmonary examination essential.

The significance of fistula-in-ano has been discussed previously.

(6) Menstrual disturbances are frequent. The flow may be much diminished or absent very early in the disease, returning to normal with improvement in health. Leucorrhoea may develop, and if present become worse.

LOCAL SYMPTOMS

(1) Cough is usually the first manifestation of the disease, and is usually the first noted by the patient. Any cough persisting over six weeks, demands the exclusion of tuberculosis as a cause. It may be present only on rising or may be intermittent during the day, and rarely worse on lying down at night. It tends to become more severe as the disease progresses, and to lessen with any period of retrogression of the lesion. The early cough is due to a bronchial catarrh induced by the presence of tubercles near the bronchial mucosa. Later there is added to this the discharge from caseous areas which drain into the bronchial tree, with tubercle bacilli present.

Occasionally the patient may have a number of symptoms pointing to the presence of tuberculosis and cough be absent, i.e. definite clinical tuberculosis may be present without cough.

(2) *Expectoration* as a rule is associated with the cough. In the early stages it may be purely from a bronchial catarrh and is usually mucoid or slightly purulent. When caseated areas are draining, it becomes more purulent and tubercle bacilli are present. It has no distinctive characteristics except perhaps when cavities are present and nummular sputum is seen.

(3) Blood may occur in the sputum in any quantity, minute specks or streaks in the mucus, as a pink or brick red sputum, or as pure blood in varying quantity up to a pint or more,

depending upon whether its source is diapedesis through an inflamed mucous membrane, oozing through the base of an ulcer, or flowing or spurting from an open vessel. Haemoptysis occurs at some time in the course of the disease in about one half of all cases of tuberculosis. The true significance of this symptom is constantly being overlooked, not in the self evident case of phthisis but in those in which blood-spitting occurs as an initial symptom without notable impairment of health or the presence of well marked physical signs. No one should be guilty of reassuring a patient with haemoptysis that he has broken a vessel in his throat unless the bleeding vessel can be seen. The significance of bloodspitting of obscure origin is admitted, yet the absence of corroborative physical signs or symptoms will frequently induce a physician to pass over the symptoms lightly and deny to the patient his suspicion or even belief as to its origin. "I do not deny that the causes of haemoptysis are numerous, but I assert that the causes of genuinely obscure haemoptysis in temperate climates may be reduced to one—pulmonary tuberculosis." (Cabot).

Recurring colds. The frequent statement "I have had a series of colds, a fresh one before the previous one cleared up" is most suggestive of tuberculosis, if the colds are bronchial. Particularly must attention be paid if there is an association with persistent or recurring transient hoarseness. It may or may not be due to a tuberculosis of the larynx.

Nervous System. Associated with the constitutional symptoms of general debility, fatigue or perhaps loss of weight, nervousness is frequently reported. It is a part of the general debility. Among the local symptoms associated with tuberculosis of the lung we frequently find (a) pain in the chest and (b) localized areas of hyperaesthesia. Chest pain is one of the most common manifestations of tuberculosis. The character of the pain varies.

In conclusion. A careful consideration of symptoms is very important in the diagnosis of pulmonary tuberculosis. At times a diagnosis may be arrived at before the appearance of definite physical signs or when physical signs are slight, and as physical signs may be present in both active and quiescent cases symptoms form a better and more accurate guide to determine activity, than does a physical examination of the chest.

DIFFERENTIAL DIAGNOSIS*

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IN this discussion of differential diagnosis of conditions which may be confused with pulmonary tuberculosis we shall consider only those cases in which there is no sputum or in which several examinations of the sputum have revealed no tubercle bacilli. Such cases have been well divided into two groups by J. A. Miller.

1. Those in which the history and symptoms are suspicious of tuberculosis, but the local lesion is slight and difficult to find. A problem in physical diagnosis.

2. Those presenting very definite physical signs in the lungs. A problem of interpretation.

Group 1. In our study we have already discussed the various lines of investigation to be made. The importance of these has been made clear.

In the personal history the patient's diagnosis of any previous illness (e.g. typhoid) should be criticized, remembering that when a patient has symptoms suggesting tuberculosis one usually can elicit a history which points out one or several periods of mild or even severe tuberculous activity. The bearing of family and household contact and of family resistance have been pointed out. The important symptoms and history of loss of weight, strength, fever, acceleration of pulse, lowered blood pressure, cough and expectoration, haemoptysis, hoarseness, gastrointestinal disturbance including fistula-in-ano, previous pleurisy and other conditions are now only mentioned in review.

I. Non tuberculous conditions whose symptoms, principally constitutional, resemble tuberculosis,

(a) Focal infections

1. Intranasal conditions.
2. Dental infections.
3. Diseased tonsils.
4. Middle ear disease.
5. Abdominal infections—localized in gall bladder, appendix, urinary system, prostate, pelvis.

These may set up such symptoms as debility,

loss of weight, fever, acceleration of pulse, pallor, anemia, and gastro-intestinal disturbances, and at times rather confusing focal signs in the lungs. These conditions are to be excluded, and a leucocyte count, both total and differential may be of assistance.

(b) Graves' disease and other disturbances of internal secretion. These may give rise to great difficulty in diagnosis especially when an enlarged thyroid causes a chronic cough, and particularly when there is a slight afternoon rise of temperature, accentuated by excitement or exertion.

(c) General asthenia,—the condition spoken of as physiological poverty. This is seen particularly in some women and during adolescence. There is a frail constitution, and if patient is subject to slight recurring colds the picture is even more confusing. In such cases prolonged observation may be necessary while carrying out treatment which is much the same whether the symptoms be due to tuberculosis or not.

(d) Chlorosis and anemia. This occurs in the same class of patients as the former and the same observations apply.

(e) Fever of obscure origin.

1. Typhoid and paratyphoid—the methods of differential diagnosis need not be discussed here. These fevers are confusing only for a time, but especially confusing when bronchitis and cough are present.
2. Malaria is confusing in localities where endemic but need only be mentioned here
3. Influenza—may be at times the diagnosis of a careless practitioner when asked for a name for a mild febrile attack. Any patient with cough, especially if fever also be present, must be kept under observation until the cough has been satisfactorily explained.

(f) Certain chronic pulmonary infections with cough and sputum, but which may present few if any physical signs.

1. Chronic bronchitis.
2. Early bronchiectasis.
3. Pulmonary abscess, if deep seated.
4. Chronic empyema, interlobar.

*Being part of a Symposium on the Diagnosis of Pulmonary Tuberculosis. Other papers will appear in next issue.

To eliminate these, careful study of the history and symptoms are essential and the X-Ray in competent hands may prove of great assistance.

II. Cases with well marked physical signs in the chest. In this second group are a number of conditions which present physical signs which at times are confusing.

(a) Emphysema with chronic bronchitis. A number of points may be considered, seasonal variation, the number of attacks, the constitutional effects, amount and character of dyspnea, the bilateral and usually basal distribution of the rales and their bronchial character. The rales may lessen or disappear temporarily with cough and from day to day, while those of tuberculosis are more apical, constant, and increase with cough.

(b) Post influenzal conditions.

1. Unresolved or subacute or chronic bronchopneumonia.
2. Bronchiectasis.
3. Abscess.
4. Chronic empyema.

These have occurred frequently following epidemic influenza and may occur independent of the presence of an epidemic. They have been grouped by some writers under the title chronic pulmonary suppuration. They are to be excluded in all cases with persisting cough, with purulent sputum in which repeated examination reveals no tubercle bacilli. When the infection is extensive or near the surface of the lung there are usually very definite physical signs. In bronchiectasis and abscess severe haemoptysis may occur which still further confuses. There may be persistent fever or recurring attacks. Whereas the principal lesions in tuberculosis are usually apical or sub-apical, in these they are principally in the lower lobes. Clubbing of the fingers is suggestive, and

does not indicate tuberculosis when tubercle bacilli are absent.

The rarer pulmonary conditions of malignant disease, syphilis, the mycotic infections and the various forms of miners phthisis (pneumoconiosis) are only mentioned by name.

To conclude, differential diagnosis cannot be taught nor summarized in a short paper—only a few important points can be emphasized.

Usually a process at the apices should be considered tuberculous and a process at the base to be non-tuberculous until the contrary is proved, excepting when a clear history of pleurisy with effusion is present.

In the absence of constitutional signs and symptoms and little suggestive past history, there should be demanded definite physical signs in the lungs including persistent rales in one or both apices.

When suggestive constitutional symptoms are present as previously defined we should demand the finding of some abnormality in the lungs, either on ordinary physical examination or by a competent radiologist.

A frank haemoptysis is to be considered evidence of active tuberculosis until the contrary is proved.

A history of pleurisy with effusion, of fistula-in-ano with suggestive symptoms or physical signs will go far to confirm a diagnosis.

In doubtful cases, there should be two to four weeks' observation of pulse, temperature, and weight with repeated sputum examinations and clinical study. Radiological studies must not be omitted.

And in a disease where so much depends upon early diagnosis and treatment the ethics of our association demand the assistance to be gained by conference and consultation.

Methods of Precision in Diagnosis of Diabetes.—In the cases cited by HENRY J. JOHN, Cleveland, the condition was diagnosed as diabetes mellitus by the patient's physician on the basis that she had sugar in the urine. She was put on a rigidly restricted diet and kept on it until she had lost almost 50 per cent of her weight; but she still showed sugar in the urine. Further examination revealed that she had a normal blood sugar content; and her ability to utilize carbohydrates—the glucose tolerance test—was demonstrated to

be normal by a perfectly normal curve; that is, she was able to utilize all the carbohydrates one could give her. This was strikingly demonstrated later on, when a heavy carbohydrate diet, high in calories as well, failed at any time to bring her blood sugar above the normal level. These findings show clearly that the case was not one of diabetes, in spite of the fact that there was sugar in the urine, but a case of a kidney permeable to sugar, a fairly common condition.—*Jour. A. M. A.*, Jan. 14, 1922.

A TUBERCULOSIS SURVEY OF 1346 SCHOOL CHILDREN IN SASKATCHEWAN

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IN July 1921, a Royal Commission was appointed by the Lieut. Governor in Council, in Saskatchewan, to investigate the extent of tuberculosis in this province. A tuberculosis survey of 1346 of the 170,000 school children in the province was one of the tasks undertaken by the Commission.

The objects of the school survey were fourfold:—

- 1.—To determine the incidence of tuberculous infection among the school children.
- 2.—To discover as far as possible the sources of tuberculous infection in the areas selected.
- 3.—To ascertain the prevalence of the pathological, economic and social conditions which would tend to develop tuberculous infection into tuberculous disease.
- 4.—To find the frequency of tuberculous disease among the school children.

From the above objects you will see that the problem was approached from the preventive end, stressing the incidence of tuberculous infection and the presence of pathological conditions that would contribute to the breakdown. The finding of cases of active disease was secondary and part of the larger plan. Eight areas in the province were selected as being representative and suitable for this investigation. Arrangements were made by the Chairman of the Commission with the school boards for the survey in these areas. The parents were circularized and permission secured for complete examination of their children. Approximately two hundred children between the ages of 6 and 14 were selected for examination in each area. In all, 1184 white and 162 Indian children were examined. The examining team consisted of four nurses and two chest specialists whose services were required continuously throughout the survey; a dentist, and two, ear, nose and throat specialists, whose services were required for two days only in each area. The work was planned so as to commence the examinations in an area on Monday and complete it within the school week.

The examination consisted of two parts. A preliminary, or selective examination for the purpose of selecting suspects; and a final or diagnostic examination of all children selected as suspicious by the preliminary examination. The principle of selection of cases was as follows:—All children received the tuberculin test and had an afternoon temperature and pulse taken. These were taken in the classrooms, the thermometer remaining in the mouth ten minutes. Those whose temperature was above 99.4 or had a marked acceleration of pulse had both temperature and pulse checked the following afternoon. In the meantime the weight had been recorded and reduced to variation from normal; the teeth and tonsils had been examined by the specialists and findings recorded. The children appeared at the 48 hour interval to have the result of the first tuberculin test recorded, if negative, it was repeated. On this occasion the chest specialist palpated the cervical region for glands, and examined the child's chest for conformation, movement, venous arborization and evidence of winged scapulae.

The quantities in the problematic equation for the selection of suspect cases were then: (1) Undernourishment; (2) elevated temperature; (3) accelerated pulse; (4) glandular enlargement; (5) flat chest; (6) limitation of chest movement; (7) physical energy; (8) activity in sports; (9) tuberculin reaction. Taking into account these signs and symptoms, and making allowances for reaction in the case of focal infection and acute upper respiratory diseases, these cases were sifted down to those considered suspicious of tuberculosis, and the latter were selected for complete chest examination. Out of the 1,184 white children, 286 or 24% received a complete chest examination, and of this number, 46 had radiographs of chest taken.

Incidence of Infection Among School Children

In order to find out the extent of tuberculous infection the tuberculin cutaneous test was used.

This test was made on 1,346 children in attendance at schools in eight representative areas in the province and it was found that 56.6% showed signs of previous infection with tuberculosis. The incidence of infection among the males was slightly higher than that found among females, being 57.1% in the former, as compared with 54.9% in the latter. It will be found from the incidence by age that 44.4% of the children were infected at the age of 6 years, the age at which the average child commences school. An increasing percentage reacted positively each year (excepting an irregularity at the age of 9 years) reaching 60.9% at the age of 14. It was found from the incidence by nationality that the Indian children showed a very high percentage of infection—93.1%, compared with the average for other racial origins—54%. The relation between incidence of infection and place of birth throws some light on the tuberculization of the Saskatchewan-born as compared with those born in other provinces of Canada as well as with British born. The number of Europeans as well as Americans born in the area of the survey was not sufficiently large to justify a conclusion.

Sources of Tuberculous Infection

The investigation of the sources of tuberculous infection revealed the fact that 10% of the 1,184 children examined had a history of exposure in their homes at some time to persons suffering from tuberculosis. The possibility of exposure in the community is suggested by the fact that in the representative areas from which the children examined were selected, 753 persons died of the disease during the past four years.

488 of these died in their homes without having had a special training in the precaution necessary to be observed in order to protect others.

The result of tuberculin tests made on 3,649 milk cows in the eight selected areas was as follows:—

In three of the areas where many of the cattle had been tested for several successive years, 2,791 tests were made and 3.8% reacted positively. In the remaining five areas where the cattle had not been previously examined, 858 milk cows were tested and 20.1% reacted positively. Four of the latter areas were rural and had no large dairy herds. The cows supplying milk to 470 children that were examined, although but 18.3% of these cattle reacted positive, the milk from these reactors contaminated the milk supply of 224 or 47.6% of the children examined in these areas.

Conditions Which Might Contribute to the Development of Tuberculosis Disease

From the survey made of the home conditions in the areas selected it would not seem that this could be considered an important factor. Home conditions were found excellent in 5.7%, good in 84.8% and bad in 9.4%.

Among the conditions found that would predispose to tuberculous disease, undernourishment was the most outstanding. 40.9% of the 1,346 children examined were 5 pounds or more underweight for height and age. 11.3% were five pounds or more underweight and classified as apparently thin by the medical examiners. The undernourishment, however, was not found to be directly accounted for by insufficient food, inasmuch as it was found almost as frequently

Born in Saskatchewan, including Indians	845	of which	58.9%	found	infected.
Born outside Saskatchewan—Canadian, British and European	501	"	54.9%	"	"
Born outside Saskatchewan in other provinces	238	"	50.0%	"	"
Born in British Isles	165	"	61.2%	"	"
Born in United States	64	"	42.0%	"	"
European born, including French, German, Roumanian and Russian	34	"	52.0%	"	"
Saskatchewan born, not including Indians	685	"	51.0%	"	"
Saskatchewan born Indians	162	"	93.0%	"	"

The above figures would tend to show that tuberculous infection among Saskatchewan born white children is less widespread than is infection among the children of our immigrants as a whole, in proportion of 51% to 54%, but slightly more widespread than among our immigrants from sister provinces, (in proportion of 51% to 50%).

Selecting a definite age group for comparison of the Commission's findings in Saskatchewan with those found in similar surveys elsewhere, we find the following:—

Vender and Johnson, St. Louis, U.S.A.	479	children age 6-14	31.9%	found	infected
Hamberger and Monti, Vienna, Austria	219	" " 6-14	72.2%	"	"
Saskatchewan	1260	" " 6-14	56.6%	"	"
Framingham, Mass.	94	" " 6-7	45.7%	"	"
Saskatchewan	45	" " 6-7	44.4%	"	"
Von Pirquet, Vienna	147	" " 10-14	70.0%	"	"
Saskatchewan	795	" " 10-14	57.4%	"	"

From the above it is evident that the school children of Saskatchewan are extensively infected with tuberculosis, although not so widely infected as those in the large city of Vienna. Nevertheless the degree of infection is higher than might be expected in a province in which there are but small cities and a large rural population.

among those with ample as among those with limited means.

Bad teeth was a condition found which would tend to lower resistance and contribute to the development of tuberculosis. Of the 1,346 mouths examined, 47.1% had one or more decaying permanent teeth. Bad prophylaxis and caries of tooth seemed to bear a direct relationship to increased incidence of infection. In the above mentioned group infection was found to be 13% higher among children with bad prophylaxis of the teeth, than among those with good, and 4% higher among those with caries than among those without caries.

Diseased tonsils was a condition present which would contribute to the breakdown. 25.3% of the children examined by throat specialists had diseased tonsils and 18.8% had excessive adenoid tissue.

A history of the acute infectious diseases from which these children had suffered, revealed the fact that before leaving public school 50.7% had suffered from either measles, pertussis or influenza, and 16.3% had passed through a series of three or more acute infectious diseases. Only 49.3% escaped all acute infectious diseases.

Frequency of Active Disease

As a result of the survey it was found that among the 1,184 white children examined, 10 or .84% showed clinical signs, symptoms and X-Ray evidence of active tuberculosis. These children were advised to take treatment in the Sanatorium. 30 or 2.5% showed signs or symptoms more or less suspicious of activity. These children were referred to their family physician for observation.

ERGOT, QUININE AND PITUITRIN

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ERGOT

ERGOT of rye was known and used for a long period in Germany under the name of *Rockenmutter*. French writers referred to its use as early as 1668, and again in 1777. So far, however, as we have definite information, ergot was first introduced into obstetric practice by Dr. Jno Stearns of New York in 1807. For a long time it was administered chiefly in the form of a powder, and it received the name of *pulvis ad partum*; but when they found it dangerous for the child Dr. Hosack suggested that it should be called *pulvis ad mortem*. (Parvin)

Dewees, in his "System of Midwifery," published in 1839, expressed the opinion that it increased both "alternate contraction" and "tonic contraction," and materially assisted in the expulsion of the child, thus making the use of the forceps unnecessary; but gave a distinct warning that indiscriminate use, or excessive

dosage, or both combined, involved grave danger to both mother and child.

It soon came into general use in England, though a few leading obstetricians fully appreciated its dangers, and recommended caution and care in its use, without much effect however, as to the majority of physicians, and nearly all the midwives. Its most enthusiastic supporter was Ramsbotham, who used it freely in tedious labours and also for the induction of premature labour. He reported fifty cases in which the uterus was emptied by the administration of this drug. How he managed is rather a mystery as Murphy and other equally able experts, were unable to accomplish it. Ramsbotham, however, acknowledged that his child mortality was 50% or more, and that, in itself, was enough to make the method unpopular.

Before long, in the United States, its use became general, and it was given in such a careless way that the results were serious. Because of this, many of the best obstetricians expressed

the opinion that ergot should be banished from obstetric practice. But others who had great faith in its merits, when properly used, thought otherwise.

QUININE

The power of quinine to produce uterine contractions was first announced by J. S. Wilson, a physician of the Southern States, in 1855. It was largely used as an oxytocic for some time before its fame had spread to other regions. Its value as an ecboic became known in France in 1871, and within a few years it came into fairly general use in Europe, the United States and Canada. In 1875-1880 Drs. Fordyce Barker of New York and Albert H. Smith of Philadelphia used it largely, and spoke well of it. Dr. H. F. Campbell, at a meeting of the American Gynaecological Society in 1881, agreed with Barker as to its action during labour, and at the same time expressed the opinion (with apparently the general concurrence of those present) that quinine, except in cases of idiosyncrasy, or from injudicious administration, exercises no influence to superinduce premature expulsion of the foetus.

At that time many were hoping that quinine might be used to produce premature labour, but all efforts in that direction were unsatisfactory. There is no doubt that quinine helps to promote uterine contractions after they have begun. Its action in that regard, however, is not constant and is largely like that of strychnine, but one good feature in its action is that, unlike ergot, quinine causes intermittent and not tetanic contractions. As to the efforts now put forth to induce premature labour, I think, from what I have heard, they are so much like those that were unsuccessful forty years ago that I don't expect very favourable results.

MEDDLESOME MIDWIFERY

In endeavouring to help our patient in labour we may err in various ways. The origin of that pregnant sentence—"Meddlesome Midwifery is bad"—is interesting. It was first used by Blundell about 100 years ago. At that time Dr. James Blundell was lecturer on midwifery at Guy's Hospital, London, from which position he retired about 1840. He was probably the ablest teacher of obstetrics of his time, and possessed mental superiority so great that he was called

the "Lord Bacon of our profession." He held the opinion that a lingering labour was not usually dangerous. He dreaded most the following procedures:- early rupture of the membranes; frequent use of the lever and vectis (instruments scarcely known now); exciting uterine contractions by compression and irritation of the mouth and neck of the uterus and vagina beneath; ergot too early and too much; turning the child when not necessary; perforation of the head of the child.

He said the physician was often forced to act, and with vigour too; but in general, the less he interfered the better. "He is often the best accoucheur who keeps his hands in his pockets." Some of the obstetricians of that time criticized adversely, and said that Blundell encouraged the "expectant" plan, which often meant that the woman was allowed to remain with the head impacted for scores of hours with an after result of vesico or recto-vaginal fistula. But Blundell never countenanced any such inactivity. However, the part of this "Meddlesome Midwifery," that properly comes within the scope of this paper is the too early and too frequent use of ergot.

When I first engaged in obstetrical practice our meddlesome faults in Canada were chiefly the following:- undue pressure over the fundus; premature rupture of the membranes; unwise digital dilatation of the os uteri; rapid extraction of the placenta; too early and too frequent use of ergot. But apart from our faults, our methods were simple, our faith in ergot was great. Instruments such as forceps were unnecessary. The usual outfit in going to a case of labour included a bottle of ergot and a long index fingernail—the latter to puncture the membranes, the former to empty the uterus.

PITUITRIN

But now, as we have come into the pituitrin era, our outfit consists of a box of ampules and a hypodermic needle. Oliver and Schaefer told us something about the extract of the posterior lobe of the pituitary in 1895. Drs. Rucker and Haskell, of Richmond, Va., gave us some interesting information about its obstetric employment in the Journal of American Medical Association, May 21, 1921. Blair Bell and Dale described its stimulant action on uterine muscular fibres in 1909 and 1910. The Germans in

1911 and 1912 discovered that "its action was marvellous." That of course settled the matter especially in those centres where German "Kultur" is worshipped.

The fame of pituitrin travelled with even greater rapidity than did that of ergot 100 years ago. It captured the good old conservative South, the country of Rucker and Haskell, who tell us that in various parts of the Southern States the country practitioners use it as a matter of routine in their obstetric practice. It also spread to other countries largely peopled by admirers of the German methods, Cuba, Porto Rico, South America, and-----Toronto.

About six months ago I had associated with me in a case of labour, a good physician of thirty years standing, an excellent obstetrician, and an intimate friend (Jones let me call him). The patient was in good condition, with cervix fairly well dilated and pelvic floor yielding. Jones, who was keeping the patient slightly anaesthetized, suggested pituitrin, and 1 c. c. was injected. After a time he advised a second ampule; but I said no—not now. In a few minutes after he remarked "they say that if one dose does not act within half an hour a second should be given. I never wait longer than twenty minutes." I answered "I'll not discuss the matter now, but will not give any more."

By way of explanation I may say I refused to act on Jones' second suggestion because I did not like the effect of the first dose. The uterine contractions were increased but altered in character, and the expelling force was, I thought, diminished. The os was slightly tightened, and the pelvic floor more rigid. I feared that further injection of the pituitrin would increase these evils, and though the child would probably be expelled within a limited time, there was a likelihood that with the expulsion there would be some laceration of the cervix, or the pelvic floor, or perinaeum, or all three combined, with a possible danger (perhaps one chance in a hundred or one in a thousand) of rupture of the uterus. After a time, with a little more anaesthetic administered, nature soon worked in her own safe way. The cervix again became dilated, the pelvic floor and perinaeum became softened and stretchable, and everything was ready for delivery. Then after a slight delay the forceps were applied and the child extracted slowly, carefully and easily, in perfect condition, without the

slightest laceration or injury of any sort to the mother, who afterwards made a rapid and complete recovery.

In a conversation after, I told Jones the medicine had not acted well because of which I feared lacerations and possibly rupture of the uterus. He told me he had no knowledge of results so serious but had noticed bad symptoms occasionally, and controlled them with chloroform or ether. Then to my surprise and sorrow I discovered that he had acquired the pituitrin habit, and in justification thereof he informed me that obstetric authorities in Toronto, and he himself as well, had found it "perfectly safe to give eight or ten doses at half hour intervals." In the old ergot days no one ever made a more perilous statement which is all the more remarkable because many of the ablest and wisest obstetricians of North America have been telling us about the grave dangers associated with its use. Edgar, certainly second to none among the most scientific, practical and discreet obstetricians in the world, told us in 1913 (Journal A.M.A., May 11, 1913) that even small doses of the pituitary extract had caused fatal compression of the foetus, premature separation of the placenta, and even rupture of the uterus.

The following list of dangers and accidents from the use of pituitrin is rather startling:—rupture of the uterus, premature separation of the placenta, impacted face presentations, uterine tetany, laceration of the cervix, injury to pelvic floor, laceration of the perinaeum, disturbance of normal contraction causing tonic spasm of Bandl's ring with incarceration of the placenta.

The number of deaths from rupture of the uterus is so large as to be quite or almost unbelievable until one examines the records in detail. Rucker and Haskell in the paper already referred to, report over fifty cases. I have seen many reports of such casualties in *Progressive Medicine*, one of which in its issue of September 1, 1918, is sadly interesting. A healthy primipara, occipito-posterior position, cervix moderately dilated; four drops injected—thirty-five minutes after, five and one-half drops injected. During the second pain, the patient collapsed from rupture of the uterus, the abdomen was opened at once, the child was extracted, the patient died in two or three minutes. In this instance the amount injected in two doses was altogether only a little more than half of 1 c. c.,

and yet death came unexpectedly and suddenly before there was the slightest suspicion of danger on the part of those in attendance.

The numbers of fatalities from the use of pituitrin during the last six years has run far into the hundreds. We may suspect there have been gross exaggerations. Let us suppose there have been such, and that they have been ten fold (which I don't believe) we must surely conclude that the net results are terrible to contemplate.

Let me say frankly in conclusion, that the tone of this paper is quite onesided and pessimistic. I may say incidentally that I have no great admiration for the pessimist; and I think the Irishman was not far wrong when he described him as follows: "He's a feller pwhat burns his bridges behind him an' thin crosses

thim before he comes to thim." I have learned so much about the evils and dangers to both mother and child of drugs which greatly increase the driving force of the uterine muscles that I may be inclined to overlook some of the good results produced by these same drugs when properly used. However, I quite realize that the three drugs mentioned have great powers for good if wisely administered. And in connection therewith I have great faith in the common sense and good judgment of the profession of Ontario, especially that portion included in the membership of this Association. Let them study the question in the light of their every day experience. I have a fixed opinion that when they have done so their decision will not be very far wrong.

A REPORT ON RECENT METABOLIC FINDINGS IN THE DIAGNOSIS AND TREATMENT OF DISEASES OF THE THYROID GLAND*

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THE metabolic rate or basal metabolism is the rate at which the life process is proceeding within the body and is the measurement of the minimum heat production in a person in a condition of physical, alimentary, and mental rest.

Direct calorimetry has for many years been practiced by scientists, but such a difficult procedure could not be used to clinical advantage as a routine.

Indirect calorimetry, however, as practiced more recently by the use of certain instruments, has provided a simple, yet fairly accurate, means of ascertaining the metabolic rate of an individual.

In indirect calorimetry we have the open and closed methods. Against the open method stands the objection that it is a complicated procedure requiring quite long periods of the time of trained technicians. Furthermore this instru-

ment is a stationary apparatus which of necessity narrows its field of usefulness. The closed type of instrument has the advantage of simplicity in operation, and requires much less time for carrying out the test. In addition, a portable apparatus is satisfactory. It has, however, the disadvantage that in nervous irregular breathers there may be a slight error in the reading due to the lungs being less expanded at the finishing time than at the point of commencement or vice versa. This irregular breathing can usually be detected by an observant operator and by running the test for a longer period of time than usual, the error can be greatly reduced.

The basis of the test is the rate of oxygen consumption by the cells of the body, and if the respiratory quotient is to be obtained, it is necessary to estimate also the amount of carbon dioxide given off by the lungs during the same period of time. The latter procedure is not neces-

*This paper was read before January, 1922, meeting of "The Winnipeg Medical Association."

sary unless a very delicate reading is required and accordingly the more simple and commonly used instruments base their findings on the rate of oxygen consumption alone.

The usefulness of basal metabolism estimation from a clinical point of view has become so well established that it needs no defence by me. Its chief field of usefulness is in diseased conditions of the thyroid gland.

In 1895, Magnus Levy was the first to demonstrate an increase of metabolism in hyperthyroidism and a decrease in myxoedema. Since then, Hirschloff, Bergman, DuBois, Means, Benedict, Plummer, Boothby and many others have done much work on this subject with the result that the thyroid gland has been shown to govern very closely the rate of body metabolism, an increase in the thyroid activity causing an increase in rate of metabolism, while a decrease in thyroid activity causes a lowered rate of metabolism.

There are other conditions in addition to disordered function of the thyroid which cause the metabolic rate to deviate from normal. Chief among those increasing the metabolism are fever of any kind, lymphatic leukaemia, pernicious anemia, acromegaly and acute diabetes with acidosis, while the disorders that decrease metabolism are chiefly hypopituitarism, diabetes with marked emaciation, starvation and wasting disease.

It is therefore necessary in interpreting readings of abnormal metabolic rates to exclude such conditions as these before laying the cause at the door of the thyroid. It is to be remembered, however, that a reading higher than plus 40 or lower than minus 20 is usually thyroid in origin, any variation of the rate from normal in the other diseases mentioned, usually falling within these limits.

The value of basal metabolism in disease of the thyroid gland is the subject matter of this paper, and the conclusions arrived at are based on 125 different metabolic readings done on 105 different persons between April, 1921, and December 31st, 1921, together with at least a superficial clinical study of the case. All patients included in this series were suffering from a pathological condition with symptoms suggestive of thyroid disease. Quite a number of the series were my own cases and these I was able to follow throughout their illness. The balance

of the series were cases referred by their attending doctor to me for basal metabolism estimation and in this group I have been unable to draw any conclusions in regard to the progress of the case after diagnosis, i.e.; during the period of treatment. In interpreting the results I have considered any reading between minus 15% and plus 15% as normal at the same time becoming suspicious of a minus 15% rate and advising second or third readings at intervals of a few days. On the other hand any reading between plus 15 and 20% was not considered as definitely due to hyperthyroidism and wherever possible second and even third readings were obtained, and where persistently above plus 20% a cause should be carefully looked for. A few of these mild cases of hyperthyroidism I found to exist in young women, with apparently simple colloid goiter of puberty or adolescence which no doubt were mildly activated.

These results I will take up under two headings, viz: value of basal metabolism in (1) Diagnosis. (2) Treatment.

(1).—Value in Diagnosis.

In this series of 105 persons, 38 cases or 36.19% had normal metabolic rate, 62 cases or 59.09% had abnormally high metabolic rate, while 5 cases or 4.76% had abnormally low rate.

(a) In analyzing the group of 38 cases with normal metabolic rate we find that the final diagnoses come under the following heads in order of frequency.

<i>Final Diagnosis;</i>	<i>The reason for suspecting metabolic disturbances</i>
(1) Nontoxic goiters of different types.	Enlarged thyroid gland.
(2) Psychoneuroses.	Coincident goiter, nervousness, weakness, easily tired, etc.
(3) Obesity and mental defects.	Sluggish mentality, loss of hair, oedema and other symptoms of myxoedema.
(4) Incipient tuberculosis.	Tachycardia, loss of weight, hyperhydrosis, asthenia with or without struma.
(5) Essential hypertension.	Arterial hypertension with or without struma.
(6) So-called goiter wreckage cases.	Broken down circulatory or sympathetic system or both with a history of long-standing goiter.

In this group of cases, suspicious clinically of thyroid disease, but with normal metabolic readings, we find conditions of disease which have never been related in any way to the thy-

roid gland as well as conditions of disease which are the result of old hyperthyroidism although the thyroid gland has long since ceased to hyperfunction. I refer here more especially to the goiter wreckage cases, the gland having long since "burned itself out," so to speak, leaving as the result, a broken down circulatory or sympathetic nervous system which, because of organic changes, are permanent disabilities.

Without the basal metabolism, in many of these cases, one is at a loss to proceed with treatment, whether for suspicious hyperthyroidism which may be neurasthenia, or incipient tuberculosis with simple thyroid enlargement, or for suspicious myxoedema.

Should thyroid therapy, whether medical or surgical, be proceeded with in these cases incorrectly diagnosed, the patient is the sufferer, the doctor condemned, and legitimate thyroid therapy discredited. It therefore behooves us first of all to make sure hyperthyroidism exists before we attempt to reduce it and also to be quite sure hypothyroidism exists before thyroid feeding is begun. Nothing can do this more dramatically than carefully done metabolism estimations.

(b) In analyzing the group of 62 cases with hyperthyroidism, I feel convinced that many could not have been diagnosed definitely without the knowledge of existing basal metabolism. Many cases of arterial hypertension of previously unknown origin have been shown to be due to hyperthyroidism usually of the type secondary to toxic adenoma of the thyroid.

A striking feature has been the frequency with which hyperthyroidism exists with certain of the previously thought constant signs or symptoms absent such as, no apparent enlargement of the thyroid gland or the symptoms largely referable to the circulatory system. Furthermore the degree of hyperthyroidism does not in all cases correspond with the clinical picture. For instance, with very marked symptoms the metabolic rate may be found to be only moderately increased, while in some cases the metabolic rate has been found to be much higher than the signs and symptoms would indicate. As a rule however, the two conform with fair regularity.

The basal metabolism is especially valuable in diagnosis where hyperthyroidism supervenes during the course of another disease such as following operation for some other condition or

during pregnancy or immediately following child birth. The clinical picture may be alarming and the tendency is to look for the cause in some complication of the disease under treatment, operation or confinement as the case may be; the thyroid probably not being at first suspected. In this connection I recently saw a patient a few days after her confinement in consultation with the obstetrician. Immediately following a difficult labor she had become extremely ill, vomiting, intractable diarrhoea, very nervous, tossing about in bed, pulse very rapid, and fever from 99 to 102.F. with hyperdrosis. The natural conclusion to arrive at first was puerperal infection, even in the face of an existing enlarged thyroid which had been present many years with little inconvenience so far as she knew. She had a very high metabolic rate which, with physical findings, proved beyond doubt the cause of the unexpected disturbance. The obstetrician was suspicious of the thyroid in this case before I saw the patient.

(c) In the third group, that of hypothyroidism, I found five very definite cases of myxoedema, three males and two females; this order is usually reversed, myxoedema being more common in females. There was no familial tendency in this group of five, and the origin was apparently spontaneous, with no history of degenerative or inflammatory disease of the thyroid gland nor of operation on the gland.

This disease is simulated very closely by other conditions and on several occasions cases have presented themselves with certain symptoms which suggest myxoedema but basal metabolism has been normal. In such cases no good and a great deal of harm may be done by the injudicious administration of thyroid extract. In this connection I recently examined a patient being treated for myxoedema who had a basal metabolic rate of plus 48%, was nervous and steadily losing weight. This patient probably had had no thyroid disturbances and the thyroid feeding had produced a degree of hyperthyroidism. Quite frequently too, the basal metabolism may be asked for in cases suspected of myxoedema during a period of active thyroid feeding and a normal or higher than normal rate may be obtained. In these cases in order to find out the exact degree of hyperthyroidism without treatment, they must be left about three weeks in order to give time for the products of the

artificially fed thyroid to be entirely eliminated from, or consumed by, the body.

(2) *Value of Basal Metabolism in Treatment of Thyroid Disorders.*

Having definitely established the existence of hyperthyroidism or hypothyroidism, we have now to decide upon and carry out treatment which will be of the greatest benefit to the patient and carry with it the least danger.

(a) *Hyperthyroidism*—These cases if treated medically or by rest, diet, or radiotherapy should have their metabolic rate taken at intervals, this being the most reliable index to the improvement or aggravation of the disease. Especially is this so in X-ray treatment where it is to be remembered that Roentgen rays may for a time stimulate the thyroid tissue, but soon degenerative reaction takes place and if overdosage is practiced, such a degree of destruction of thyroid epithelium may occur as to cause hypothyroidism. This can best be guarded against by frequent metabolism readings.

Should operative interference be practiced, it is important to institute such procedure during a remission rather than during an exacerbation of the disease. Furthermore, following operation, it is very instructive to note the fall in metabolic rate. In thyroid ligations the drop in metabolic rate in my cases averaged from 15 to 40 per cent., and following thyroidectomy the metabolic rate quickly dropped to normal or almost to normal with three weeks after operation. The ligations apply to Graves' disease alone and only the severe forms of this disease were first ligated. The metabolic readings were noted two to three months following double ligation. The normal readings following thyroidectomy refer to all toxic goiters so treated. If the metabolic rate can be so re-

duced following thyroidectomy in these toxic goiters, surely we have in surgery a form of treatment of great value in this disease.

Eberts recently has reported a series of twelve cases, seven Graves' disease and five toxic adenoma, in which the metabolic rate quickly dropped to normal or almost normal following operation in each case.

(b) In myxoedema it is important that the low basal metabolism be increased to normal and the most accurate guide to this end is careful metabolic studies at intervals during early treatment until it is ascertained just how much thyroid extract or dried gland is required to keep the body functions normal. And in this manner over or under dosage is prevented. It is to be remembered too, that the normal thyroid gland of animals has a very definite seasonal variation in iodine or thyroxin content. In January, February, and March, the thyroxin or iodine content is much lower than in midsummer, so that an animal's gland taken at this season will be much less potent than a gland taken in midsummer, and in this way, an error in standardization of potency of the preparation used may creep in, indicating the need for all the more careful checking of basal metabolism during treatment.

Conclusions.

With a view to making medical practice an exact science the introduction of indirect calorimetry into the field of thyroid disease has done much. In the differential diagnosis of both hyperthyroidism and myxoedema as well as in their treatment, metabolic studies are invaluable. Basal metabolism must not, however, be used in any manner to the exclusion of the clinical findings and history, but these three should be inseparably associated in the diagnosis and treatment of thyroid disease.

The Schoolchild Before and After Tonsil and Adenoid Removal.—After examining about 7,500 children, LITTLETON DAVIS, Roanoke, Va. (Journal A. M. A., April 22, 1922), is convinced that the incidence of heart disease in the great number of children referred for tonsil operations is very small. The cervical glands enlarge as

often after as before tonsil removal. There is more complete relief from symptoms when removal is done at from 7 to 10 years of age, in the majority of cases. Early removal gives mechanical relief for a time; but the original cause of the growths, whatever it may be, is present and active until a much later period.

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In this series 6 cases or 20% are secondary to operation. Both McGlannan and Finney give 40% of post operation cases in their series. This cause of obstruction is less to-day. Our series is of the last 3 years, while Finney's is for 10 years. During the 8 years from the beginning of his series and the beginning of this, there has been great improvement in the toilet of the peritoneum and consequently fewer adhesions. Greater care in covering raw areas, lessened handling of intestines during operation, fewer packs or sponges placed in the abdomen, and probably some change in material, with less abrasive qualities than gauze, will still lower the percentage of post operation intestinal obstructions. Therefore in looking over the series, we find that there is 60% of the cases which we may put into the preventable class; and as surgeons we should endeavour, by education of the public and by greater care ourselves in the conduct of operations, to eliminate this large group.

Again, in going over these figures, one is struck by several points. First, that of all bowel obstructions, the safest to have is strangulated hernia, 66% recovering. The next is the effect of the time intervening between the onset and operation on the result, where the time was short, average 1.5-6 days, the patient recovered; while, with an interval of 3½ days, the illness proved fatal.

Evidently it is early diagnosis of the visible and palpable form of obstruction and the later diagnosis of the invisible, which determines the mortality. One, because the trouble which can be seen and felt by the physician or surgeon is treated as an emergency operation; while, in the other variety, much time is wasted in endeavouring to prove by means of purgatives and enemas that an obstruction exists. What is needed apparently is a pathognomonic syndrome, or, if such exists, more drill in education on this point. Is there such a syndrome? The history usually is a sudden attack of abdominal pain, either spasmodic, or a steady undertone of pain with spasmodic exacerbations: this exacerbation is accompanied by vomiting and is followed by slight relief: after which the cycle is repeated.

Sex—Males, 24; Females, 9

<i>Cause of Obstruction</i>	Number	<i>Ultimate Recov'd</i>	<i>Result Died</i>
Not stated.....	4	—	4
Intussusception.....	5	3	2
Bands—Primary.....	3	—	3
Secondary to Op.....	6	2	4
Volvulus.....	1	—	1
Hernia—strangulated.....	12	8	4
<hr/>			
Mortality without operation.....		3	1
“ of operated cases.....		12	15
“ of “ “.....		55.5%	
Days intervening between onset and operation:			
Fatal cases.....		3½	
Recovered.....		15-6	

When the results as here given are considered, it must be acknowledged that in the treatment of this disease we have not made much advance. Let us compare with other series which have been collected:—

McGlannan in 1915 published a series of 276 cases, with a mortality of 45.7% and Finney in 1920 a series of 245, of which 217 were operated on, with a mortality of 36%. These include chronic obstruction as well, and so cannot be fairly compared with the percentages given in this series, which are of the acute type.

In these few cases it is interesting to point out that strangulated hernia forms 40% while obstruction from secondary bands is 20% of the total. These are in a measure preventable diseases. McGlannan points out in his series of 276 that 10% had followed drainage in appendix operations; thus early operation in appendicitis and hernia would eliminate a large percentage of obstructions.

*Read before North Pacific Surgical Association, Vancouver, B.C., December 9th, 1921.

The abdomen is soft and temperature and pulse normal. Palpation of the abdomen may elicit tenderness, and sometimes the patient can point to the exact spot of the obstruction. Such is the early picture in obstruction. As time passes, the abdomen becomes more and more distended. Acute pain ceases and there is left just the undertone or steady ache, while vomiting now has become more regurgitation; the patient is more comfortable in a way but feels extremely sick; the temperature remains normal and pulse may be normal or gradually increase in rate and become lower in tension. So far I have not mentioned bowel movements, because I think this is the point that many men stumble over. Instead of relying on the picture as given above, purgatives are given, or, if suspicions are aroused, enemata may be the only means employed to produce a bowel movement. An important point is that with the small bowel most frequently involved, there is faecal material in the colon and this comes with the first or second enema, confusing the issue, and much time is lost, so that the patient has gone far into the second stage before a diagnosis is made. The third or terminal stage is characterized by distension, regurgitation of vile smelling brown fluid, absence of pain, a weak thready pulse, parched tongue and general mental indifference to surroundings—in other words the final stage of an intoxication.

Such is a brief outline picture of the three stages. The diagnosis should be made in the first stage. The syndrome is typical, sudden onset, especially after a meal or exertion; increasing waves of pain followed by vomiting with relief, together with normal pulse and temperature, and soft abdomen without tender areas. Such a picture watched over a period of a few hours is sufficient on which to make a diagnosis without waiting for bowel movements, but if added to this history there is beginning distension without rigidity, the diagnosis is very plain. If there is a history of previous abdominal operation, or of attacks of inflammation, it is additional support to the diagnosis. Care must be taken not to overlook a history of rupture which may have strangulated and then have been reduced *en bloc*.

Pathology

In discussion of the pathology and its relation to the symptoms, all are agreed on the main features. The sudden involvement of a portion of the bowel, together with the violent efforts on the part of the intestine to force a passage, so

interfere with the sympathetic nervous system that collapse occurs. The intensity of this may lessen after the first shock but remains throughout and is later merged into the toxicity. In some cases the toxicity occurs very early, while in others there is very little absorption even after 5 days of obstruction. Brooks has shown by experiment that an occluded loop of bowel with normal blood supply and intact mucous membrane may contain at least 200 times the lethal dose, and yet the animal live for many days, and Kocher in 1899 pointed out the fact that in the mucosa of obstructed intestine there were tiny ulcerations. Other experiments, together with clinical observations, lead us to conclude that there is no absorption until the mucous membrane has been damaged. This injury in many cases is due to interference with the blood supply. Strangulation of a loop means damaged mucosa and early absorption of the contained toxins. The portion of bowel proximal to the obstruction is subject to violent peristalsis, becomes congested, and small hæmorrhages occur, either because of the excessive muscular movements or because of a combination of congestion, increased peristalsis, and increasing distension, which in itself interferes with the blood supply. The breaking down of the mucous membrane now allows absorption in this portion of the intestine, and the toxic symptoms increase rapidly.

The nature and source of this toxin has been the subject of much experiment. Whipple and his colleagues believe it to be a perverted secretion of the intestine. Murphy, Vincent and Brooks think that bacterial action on the intestinal contents is the cause; while in a recent publication Eisberg endeavours to prove by experiments that in upper intestinal obstruction, at least, the toxin is due to a breaking up of the pancreatic juice. More work will have to be done on this question before it can be decided definitely. Clinically it is a well-known fact that the higher the obstruction the more intense the collapse and the earlier the toxic symptoms.

Vomiting is at first a reflex act, but after the intestine becomes distended it is the overflow of the secretion following congestion, and is of a brownish ill-smelling fluid, but not fecal. Naturally the higher the obstruction, the earlier this form of vomiting begins.

Treatment

In dealing with treatment one must differentiate between the early case and the late case.

In the early case, *i.e.* while pains are fairly constant and vomiting is a reflex act, it is sufficient to relieve the obstruction. Seldom in this stage will anything more be necessary than to release the bowel from the constriction. Occasionally when the blood vessels have been involved, resection may be necessary.

The late case, and by that I mean the case in which spasmodic pain has ceased—and regurgitation has taken the place of vomiting—must be treated quite differently. Here the first problem is to release the bowel. This I believe is essential, and as a rule not a long task. After the obstruction is relieved, the bowel may or may not need resection, or, if the condition of the patient is bad, the loop of bowel may be brought out of the wound. An enterostomy must be done whether the loop of bowel is gangrenous or not. It is in this one part of the treatment that lies the success or failure of the case. The portion of the bowel above the obstruction is distended with gas and toxic fluid, and, in addition, it is suffering from more or less muscular and nerve exhaustion. The average abdominal case suffers from a lessened peristalsis as the result of the disturbance of abdominal pressure. The obstruction case is already suffering from lessened peristaltic power, and the handling of the operation increases the trauma so that the patient rapidly absorbs the poison and succumbs. In order to avoid this, the insertion of a Paul's tube is advocated, so that the pressure from the interior of the bowel may be relieved, and then pituitrin or eserine may stimulate the peristalsis so that the bowel above will clear itself. The necessity for this was emphasized in a recent case. A patient with a strangulated hernia of 3 days' duration, vomiting dark brownish fluid, was operated on, and because there was very little distension, a tube was not put in. Immediately following the operation, the bowels began to distend and vomiting continued until death. A Paul's tube might have saved this patient.

Sometimes enterostomy without relieving the obstruction has been advocated. In a case operated on 5 days after obstruction, this was done, and although the distension and vomiting disappeared, the patient died with the usual toxic symptoms. At autopsy there was found a loop of bowel about 8 inches long caught by a band, almost gangrenous and quite distended. The

toxic absorption from this loop acted just the same as if the whole upper portion of the bowel were suffering from ileus. Therefore, if a loop of bowel is involved, it is best to relieve the obstruction before doing the enterostomy. This rule does not obtain where there is but a single constriction of the bowel, as in a constricting band, kink or tumour.

These obstruction cases on account of the vomiting and lack of fluid intake, are dehydrated, and so during operation 300—500 c. c. of 3% glucose in saline is run into the vessels. This is followed after operation by another 300 either interstitially or intravenously. By this means it is hoped to overcome the fall of blood pressure and to increase the elimination of poison.

The means used to empty the bowel of its toxic contents vary. Some advocate stripping the bowel during the operation. This has the disadvantage of increasing the trauma, although this may be offset by getting rid of the poisons, and the relief of distension so that the muscular tone of the bowel is more rapidly restored. In cases where this procedure is unwise, eserine or pituitrin may be used following the operation. In some cases these act well.

Recapitulation

First—Because of late diagnosis, many cases come too late for operation.

Second—The syndrome, of sudden onset with waves of pain coming to a climax and accompanied by vomiting, followed by relief, lax and non-distended abdomen and normal pulse and temperature, is pathognomic.

Third—Valuable time is lost in trying to make a diagnosis by enemata.

Fourth—Early cases, with spasms of pain and vomiting, need only the relief of the obstruction.

Fifth—Late cases with cessation of spasmodic pain, and with regurgitation, require enterostomy as well as relief of obstruction.

Sixth—Strangulation of bowel by interfering with blood supply increases the toxicity and the operation risk.

Seventh—Dehydration and toxicity must be overcome by subcutaneous or intravenous saline, preferably containing glucose.

Eighth—Above all, early diagnosis is essential or better results.

CREATINURIA IN CERTAIN DISEASED CONDITIONS*

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IN a case of abnormal muscular development, recently described (1), the outstanding features were musculature presenting infantile characteristics, and persistent creatinuria. This has led to investigation of certain other cases where muscular involvement was a prominent feature, in order to see what relationships exist between creatinuria and (a) absence of muscle, and (b) presence of degenerating muscular tissue (*i. e.* the gradual disappearance of muscle mass).

We give first a short resumé of the case of muscular infantilism already referred to, secondly, details of further cases studied, and thirdly, a summary of the facts already established regarding creatine metabolism along with the bearing of our new evidence upon these.

Muscular Infantilism.

R. W. T., male, 30, single, height 68 inches, weight 70 kg., has been unable all his life to perform any action calling for much muscular effort. Provided the muscular work required was small in intensity the effort could be maintained for a normal length of time. His condition is hereditary, dating back at least as far as his father's grandmother, and affecting both males and females (about 55 per cent. and 33 per cent. respectively).

The patient was under observation from September 1917 till December 1920. Chemical investigations were made from March to November 1920. Physical examination reveals no departure from normal save that the muscles of the upper limbs are somewhat small in bulk, with correspondingly small bones. There is very slight thyroid enlargement, but no sign of hyperthyroidism. The physical condition did not vary to any appreciable degree throughout the whole period of observation. Clinical findings as to low grade of musculature were confirmed by dynamometer and ergograph measurements, both suggesting an infantile condition, rather than a

degenerative process. Repeated examination over the long period of observation demonstrated that *there is absolutely no suggestion of any process of muscular wasting*. Examination revealed no abnormality in the nervous system. Histological examination of muscular tissue showed nothing abnormal.

Gymnastic exercises made no appreciable difference to muscular power. Experimental administration of adrenal gland, of thyroid, of pituitary, and of strychnine produced no striking alteration. The small variations in power which resulted are described in detail elsewhere.

While it is obviously impossible to give more than a rough idea of the muscle volume of such an individual, especially since in his case there was a tendency to general adiposity except in the upper limbs, yet we are of the opinion that an approximate figure would be about 75 per cent. of normal.

The only chemical abnormality is the constant presence of creatinuria. None of the treatments attempted while chemical examinations were being made caused decrease of this, except thyroid administration. This, prolonged, caused decrease of creatinuria, accompanied by increased muscular weakness and marked increased acidity of urine of unascertained origin.

Blood sugar and creatinine were normal.

Roughly speaking, the ratio of creatine to creatinine in urine was as 1.3. The creatinine coefficient was distinctly below normal, but total creatine plus creatinine (1.3 to 1.5 gms. per day on a meat-free diet) gave a figure approximately that for creatinine alone for an individual of his weight and build.

Examination of three-hour urine samples throughout the day and comparison with the succeeding nine-hour night sample showed no diminished creatinuria during the night, and a slight tendency to increase with increased H-ion concentration of the urine. The degree of creatinuria during short periods seemed to depend upon the degree of urine excretion. R. W. T. forms creatine at a fairly constant rate through-

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out the 24 hours, the amount removed from the blood depending on the amount of urine excreted.

Creatinuria in various conditions.

Table I shows urine creatine and creatinine contents for a number of normal boys (examined for comparison with R. W. T.) and for a number of cases in which occur different types of muscular involvement. Table II shows similar figures at various periods following amputation. Brief case reports are given.

Creatinine was estimated by the Folin method, creatine by the Folin-Benedict method. The figures for creatine are expressed in terms of creatinine.

Case Reports Tables I and II (see opposite page). Nos. 1 to 6 were all normal children.

Spinal Sclerosis.

No. 7—A. B.—Male—13—Onset 3 years previously with inability to rise on toes and persistent stumbling. Family history very pronounced. Family consists of 11 children, of whom several, both male and female, are affected in the same way with onset at about the age of 10. Father's brother also has a family of 11 children of whom several are affected with the same disease coming on at the same age. There is no record of the disease in the father's family on the paternal or maternal side. Patient walks with a shambling gait. The knees are kept bent, and the foot is kept flat on the floor. There is marked atrophy of both calves, the circumference being only 10 inches. Marked bilateral Babinsky, ankle jerks normal, knee jerks markedly increased. Cremasteric and epigastric reflexes present. Feet are tending to become hollow. The peronei are quite inefficient on both sides.

(This boy lives some distance off in the country and has not been available for prolonged study.)

Poliomyelitis.

No. 8—C. C.—Male—16—Onset at age of 2. Paralysis practically complete in both lower limbs from the waist down.

Congenital Diplegia (Little's Disease).

No. 9—M. B.—Female—16—Marked spasm of the adductors and the calf muscles. Walks on the tips of the toes with the thighs closely approximated.

Progressive Muscular Atrophy.

No. 10—D. M.—Male—28—Onset 4 years be-

fore while carrying a stretcher in France. Gradually increasing weakness of the left hand until at present there is complete wrist drop. No sensory loss. No evidence of cervical rib. Condition progressing and is involving the muscles of the upper arm. History of infection with syphilis Wassermann negative after treatment.

No. 11—R. M.—Male—34—Onset 6 months previously with cramps and stiffness in the left hand. Shows atrophy of the left forearm, marked atrophy of the pectoralis major and deltoid, and of the other shoulder muscles. Previous illnesses unimportant; family history negative for nervous disease. Wassermann negative.

No. 12—H. S.—Male—47—Onset 4 years previously, with pain in the back and shoulders. One cousin on the mother's side affected. No previous illnesses of note. Wassermann negative. Pronounced affection of the muscles of the back of the neck, of both shoulder girdles, of arms, and forearms, but the muscles of both hands are but slightly affected. In the lower limbs only the tibialis anticus on the left side shows any marked degree of wasting. Condition when examined was fairly rapidly progressive.

Acute Sciatica.

No. 13—J. S.—Male—42—Onset suddenly about 2 months before. Attack has been fairly severe; cause not ascertained. Teeth, X-Rayed, healthy. Tonsils not at fault. Appendix removed 4 years before. No venereal infection. Distinct but not extreme wasting of the muscles of the right thigh and right leg.

Complete Sciatic Nerve Lesion.

No. 14—J. A.—Male—22—Gunshot wound of the right upper thigh. Operation for suture of the right sciatic nerve July 1920. Partial recovery, but very incomplete. Trophic ulcer over the external malleolus.

Tuberculous Knee Joint.

No. 15—R. V.—Male—22—Occupation, chiropractor. Onset one year before. Discharging sinus for 8 months. Operation for excision of the knee-joint August 4th, 1920. Bone was extensively affected and there was marked involvement of the synovial membrane, and of the bursæ around the knee-joint. There is distinct atrophy of the muscles of the right thigh and of the right calf. (Subsequently there has been a distinct improvement. Muscu-

TABLE I.
CREATINURIA IN VARIOUS CONDITIONS

No.	Sex	Age Years	Condition	Diet	Date	Creatinine		Creatine	
						mg. per 100 c.c.	gm. per day	mg. per 100 c.c.	gm. per day
1.—D. O.	Male	3.6	Normal	Normal	29 Oct., '20	114	.....	17	.....
2.—C. O.	"	6.3	"	"	29 Oct., '20	100	.....	56	.....
3.—J. C.	"	7	"	"	24 Oct., '20	64	.....	15	.....
4.—H. S.	"	8	"	"	23 Oct., '20	39	.....	16	.....
5.—E. B.	"	9	"	"	22 Oct., '20	96	.....	0	.....
6.—Z. S.	"	12	"	"	23 Oct., '20	106	.....	0	.....
7.—A. B.	"	13	Spinal Sclerosis	"	30 May, '20	.....	0.41	.....	0.24
8.—C. C.	"	16	Poliomyelitis	"	6 Nov., '20	.....	1.00	.....	0.86
9.—M. B.	Female	16	Congenital Diplegia	"	6 Nov., '20	.....	1.11	.....	0.78
10.—D. M.	Male	28	Progressive Muscular Atrophy	"	29 Aug., '20	.....	1.41	.....	0.16
11.—R. M.	"	34	"	"	14 Oct., '20	.....	1.20	.....	0.37
12.—H. S.	"	47	"	"	5 May, '20	.....	1.62	.....	0
					11 June, '20	.....	1.58	.....	0.21
13.—J. S.	"	42	Acute Sciatica	"	14 Oct., '20	.....	1.75	.....	0.21
14.—J. A.	"	22	Sciatic Nerve Lesion	"	9 Nov., '20	.....	2.70	.....	0.22
15.—R. V.	"	22	Tuberculous Knee	"	6 Nov., '20	.....	1.15	.....	0
16.—G. G.	Female	35	Emaciation	"	11 Sept., '20	.....	0.16	.....	0.07
					24 Oct., '20	.....	0.48	.....	0.09
17.—M. S.	"	17	Infantilism	"	27 Sept., '20	.....	0.17	.....	0.34
18.—Ir. N.	"	3	Congenital Spinal Spastic Parapl.	"	25 Sept., '20	.....	0.13	.....	0.17
19.—Id. N.	"	7	"	Meatless	25 Sept., '20	.....	0.25	.....	0.24
20.—J. N.	Male	42	"	"	Oct., '20	.....	1.11	.....	0.28

TABLE II.
CREATINURIA AFTER AMPUTATION

No.	Date of Amputation	Nature of Amputation	Date of 24-hr. Sample	Period since Amputation days	Diet	Volume c.c.	Creatinine gm.	Creatine gm.	Total gm.	Present Weight kg.	Build	Creatinine Limits gm.	Probable Creatinine gm.
21 W.M.	Nov. 5 1920	Left Arm	5 Nov., '20 6 Nov., '20 15 Nov., '20 16 Nov., '20 17 Nov., '20	0 1 10 11 12	Normal " Meat-free "	1240 710 1150 — 1170	2.13 1.43 1.76 — 1.58	0.32 0.08 0.22 — 0.46	2.45 1.51 1.98 — 2.04	79	Stout	1.6 to 2.0	1.7
22 J. A.	Oct. 9, 1920	Leg 6 in. below knee	14 Oct., '20 6 Nov., '20 15 Nov., '20 16 Nov., '20 17 Nov., '20	5 28 37 39	Normal " Meat-free "	1135 (100) 920 1355	1.73 (0.18) 1.80 1.71	0 (0.012) 0.46 0.16	1.73 2.26 1.87	67	Medium	1.3 to 1.7	(1.5)
23 J. C.	Oct. 22 1920	"	4 Nov., '20 5 Nov., '20 15 Nov., '20 16 Nov., '20 17 Nov., '20	13 14 24 25 26	Normal " " Meat-free "	1350 930 840 790	2.71 1.36 1.58 1.73	0.33 0.31 0.20 0.64	3.04 1.67 1.78 2.37	(60)	Lean		(1.5)
24 J. Fa.	Apr. 16 1920	Leg 5 in. below knee	15 Nov., '20 16 Nov., '20 17 Nov., '20 26 Nov., '20 27 Nov., '20 28 Nov., '20	213	Normal Meat-free " " "	940 1200 1700 890	1.27 1.42 1.33 1.25	0.14 0.64 0.20 0.17	1.41 2.06 1.53 1.42	58	Lean	1.15 to 1.45	1.45
25 J. Fo.	May 5 1917	"	15 Nov., '20 16 Nov., '20 17 Nov., '20 25 Nov., '20 26 Nov., '20 27 Nov., '20	3	Normal Meat-free " " "	1085 1580 1880 1020	1.87 1.98 2.22 1.33	0 0.17 0 trace	1.87 2.15 2.22 1.33	70	Medium	1.4 to 1.75	1.6
26 J. H. C.	1896	Leg 8 in. below knee	28 Nov., '20 plus 29 Nov., '20	24	Normal	(1800)	(1.13)	(0.24)	(1.37)	(70)	Spare		

larity has been to some extent re-established, following upon the operation).

Emaciation.

No. 16—G. G.—Female—35—Has never menstruated. Weight 52 pounds. The outstanding features are extreme emaciation, childishness, and some delusive formation. This is reputed to have followed an attack of influenza. An X-Ray of the skull showed an extremely small sella that is completely closed in by the clinoid processes. The weight when the second sample was obtained had increased to 59 pounds, and there was general improvement. Since that time there has been still further improvement. (We are indebted to Dr. A. T. Mathers for the material and report on this case).

Infantilism.

No. 17—M. S.—Female—17—Never menstruated. Height 48 inches. Weight about 23 kg.

Congenital Spinal Spastic Paraplegia.

No. 18—Ir. N.—Female—3—Marked spasticity of adductor muscles and superficial calf muscles.

No. 19—Id. N.—Female—7—Marked spasticity of all muscles of both lower limbs.

No. 20—J. N.—Male—Father of Nos. 18 and 19. Walks with crutches and tripod gait. Marked spasticity of all muscles of both lower limbs.

Amputations.

No. 21—W. M.—Male—Adult—Gunshot wound left arm, compound fracture of humerus on March 12th, 1918. Complete lesion of musculospiral nerve. Operation for suture of musculospiral nerve, February 28th, 1919. Several attempts at bone-graft unsuccessful. Amputation just above the elbow, November 5th, 1920. Weight before amputation, 83 kg.

No. 22—J. A.—Male—29—Gunshot wound of the leg. Numerous operations in attempt to save leg. Amputation October 5th, 1920.

No. 23—J. C.—Male—26—Gunshot wound of the right buttock. Complete lesion of the right sciatic nerve about the great sciatic notch. Hip-joint and knee-joint ankylosed. Amputation below the knee-joint October 22nd, 1920.

No. 24—J. Fa.—Gunshot wound, left buttock, October 9th, 1918. Damage to left hip-joint causing bony ankylosis and complete lesion

of sciatic nerve. The sciatic nerve was explored on August 15th, 1919. It was found completely destroyed at level of great sciatic notch. Trophic ulcers developed. The left leg was amputated below the knee on April 16th, 1920.

No. 25—J. Fo.—Gunshot wound in right leg on October 1st, 1916. Amputation five inches below the knee on October 5th, 1917.

No. 26—J. H. C.—Male—55—Amputation 8 inches below knee, 1896. Weight about 160 pounds. (Not a patient).

(We are indebted to Capt. F. C. Wilson, C.A.M.C. for dietetic control of and collection of material from cases 21-25).

Creatine Metabolism and Creatinuria

Critical examination of the large amount of experimental evidence now available dealing with various phases of creatine and creatinine metabolism permits certain definite statements.

Normal creatinuria.

Creatine is a normal constant constituent of the urine of infants and young children, of most if not all young animals, and of some adult animals (cattle, goats, sheep, foxes, coyotes) and its presence is independent of creatine in the diet. It normally occurs in the urine of girls till puberty, and occasionally in that of human adult females even on a creatine-free diet, of bitches, and of female rabbits. The creatinuria bears no clearly defined relation to the sexual cycle in women, but it is constant in pregnancy, and is a concomitant of lactation. It is at a maximum in bitches five days after parturition.

Normal male human urine usually contains no creatine, though traces may be present in some individuals on a normal (not creatine-free) diet. It is not present in the urine of adult male guinea-pigs, monkeys, or rabbits. It is present in the urine of eunuchs castrated before puberty.

Distribution of creatine.

Striped muscle contains 0.3 to 0.5 per cent., heart-muscle 0.2 to 0.3 per cent., smooth muscle considerably less, testes over 0.1 per cent., while amounts of a smaller order are present in other body tissues. Cow's milk contains estimable amounts, probably of the same order as those in blood. Human blood contains about 0.3 mg. per 100 c. c., chiefly present in the corpuscles; the plasma only contains traces. The average amount is somewhat greater in females, and there

is a distinct correspondence between increase of plasma creatine and appearance of creatinuria.

Distribution of creatinine.

Muscle contains distinct traces of creatinine. The amounts, about 6 mg. per 100 gm., are greater in muscle than in other tissues, and in blood. Heart muscle contains more creatinine though less creatine than skeletal muscle.

Creatinine normally occurs in mammalian urine. On a meat-free diet its amount is relatively constant for man, and bears a definite ratio (Folin's creatinine-coefficient) to the body-weight (19 to 24 mg. per kg.). It is doubtful whether on a creatine-free diet the excretion of creatinine is entirely independent of the amount of protein ingested.

Effects of diet.

Feeding creatine by the mouth in amounts less than one gm. does not induce creatinuria in normal adult man. When larger amounts are fed, part is excreted in the urine unchanged; 20 per cent. of a 5 gm. dose, and over 60 per cent. of a 20 gm. dose, while a definite small proportion appears to be converted into creatinine. Similar results are obtained after subcutaneous injection. Part of the creatine cannot be accounted for, though bacterial action probably is responsible for some loss, when it is given orally, while a small part of the injected creatine appears to be stored in muscle.

The effect of feeding creatine to children is more marked; smaller amounts induce or increase creatinuria. The younger the child the more of the injected creatine is excreted unchanged, even a dose of 0.1 g. being largely recoverable in the urine.

Feeding or injecting creatinine never gives rise to creatinuria. Most of such creatinine is immediately excreted.

Meat in the diet causes increased creatinine output in man, and sometimes some degree of creatinuria, probably due in part to the creatine (and creatinine) in the (cooked) flesh. A high protein diet freed from creatine does not produce creatinuria in man, but may do so in women, and invariably does so in children.

Feeding certain corn products (starch, linseed meal, gluten meal) to pigs produces marked creatinuria. Others, equally rich in proteins (cornmeal) produce only slight traces.

It would appear therefore that *although much*

of the creatine excreted is derived directly from food, yet in young children and other young animals, to some extent in women, and continually in certain other mammals, creatinuria occurs which cannot be entirely traced to preformed creatine in the food; but is almost certainly due to creatine derived from protein sources, i. e., formed in the body from amino acids, indicating that some, if not all, of the creatine found in most of the body tissues is so formed.

Precursors of creatine in the body.

Assuming that creatine is formed by muscle several investigators have looked for increases in muscle-creatine following injection or perfusion by supposed precursors. No definite results have been obtained. Feeding experiments with such supposed precursors have had somewhat greater success; there is evidence that arginine and cystine may be transformed into creatine, since after feeding these to pigs and pups respectively, creatinuria is increased. There is some similar evidence that glycocyamine may be a precursor, while Paton and his co-workers (2) have adduced certain evidence linking creatine with guanidine, whence his suggestion that creatine is partly formed from guanidine as a detoxication product.

The site and mode of formation of creatine and creatinine will be discussed later.

Creatinuria in abnormal and pathological conditions.

Inanition in man and other mammals results within two or three days (after stored glycogen is exhausted) in decreased creatinine excretion, with excretion of a corresponding amount of creatine, the total creatine plus creatinine remaining about the same. This creatinuria is abolished by feeding carbohydrate or anything which will yield glucose in the body (high protein diet, glycerol) but occurs on a diet low in protein and deficient in carbohydrate. The same type of creatinuria occurs in the various forms of true and experimental diabetes; in these cases high protein diet does not abolish it since available glucose cannot be formed. Creatinuria cannot be related to absence of protein from the diet, nor is acidosis responsible. *Inanition creatinuria is therefore due to some abnormality in carbohydrate metabolism affecting the dehydration of creatine, so that it is incompletely transformed into creatinine.* The creatine content of muscle does not change during inanition until marked tissue catabolism ensues.

Febrile conditions produce creatinuria associated with increased creatinine excretion.

The creatinuria in children has been ascribed to immaturity in muscle (3). The case of muscular infantilism referred to above presents characteristic features resembling the condition in children. Here also there appears to be deficiency in creatinine excretion compensated by creatine.

Creatinuria, accompanied by diminished creatinine excretion, occurs in progressive muscular dystrophy, anterior poliomyelitis, amyotonia congenita (increase above normal for children), and amyotrophic lateral sclerosis, diseases in which muscle wasting occurs. It has also been observed in progressive muscular atrophy, but does not occur in myasthenia gravis (no definite change in muscle or nerve). It occurs in Graves' disease, and similarly after thyroid or thyroxin administration. (In our observations on R. W. T. under thyroid treatment, we noted initially a slight increase in the degree of creatinuria, but after some time a distinct diminution).

After amputation, if the remaining musculature is well developed creatinine excretion is increased, and creatinuria occurs (4).

It occurs in various liver conditions: carcinoma, alcoholic cirrhosis, catarrhal jaundice, cancer, phosphorus poisoning. Malignant disease of the liver is said to lower the creatine content of muscle. Malignant growths contain only traces of creatine.

Normal conditions have been recently reported in the Charcot-Hoffman form of muscular atrophy, in post-diphtheritic polyneuritis and in pernicious anaemia. After apoplexy, creatinine excretion is increased and subsequently creatine appears. In scarlet fever creatinuria appears on the second day, in typhoid fever only on the ninth day. It may occur in diphtheria in absence of fever (5).

Most of the fresh cases reported in this paper add confirmation to results previously recorded. The absence of creatinuria in the case of tuberculous knee-joint, No. 15, was due apparently to the cessation of the atrophy, (though the chemical test revealed the change before actual observation had done so). The case of congenital diplegia and those of congenital spinal spastic paraplegia, associated with increased muscle tonus without wasting, are in a separate category.

The recent amputations all show definite creatinuria, even on a meat-free diet. In cases 21-25, after collection of a 24-hour sample of urine on normal diet, the patients were placed on a meat-free diet for 48 hours, and the urine of the

second half of this period examined. The change of diet appeared to be accompanied in some cases by increased diuresis, which may account for part of the creatinuria found (since increased water-drinking, with its accompanied diuresis, leads to creatinuria). Further examination of two of these cases on a 72-hour meat-free period, in which the second and third 24-hour samples were examined, still showed definite creatinuria in the 7-month's case, and apparently a tendency to creatinuria in the 3-year case. Case No. 26 was not a hospital patient; it was difficult to get a satisfactorily controlled sample from him. A 48-hour sample was obtained, of which the approximate total only was known. During this period one meat meal a day was eaten; the creatinuria was distinct. The figures for this case are halved to show 24-hour excretion.

If the large number of conditions are considered in which creatinuria normally occurs, and with these are further taken into account the great variety of pathological conditions in which it is also found, it is evident that *the presence of creatine in urine even on a meat-free diet cannot be regarded as of any great diagnostic importance.* On the other hand, in certain cases such as muscular infantilism, and where muscle wasting is present, the variation in the amounts of creatine excreted under comparable conditions may be utilized as a control in treatment.

Lauritzen has recently suggested that the appearance of creatinuria can be used as indicative of the pre-comatose stage in diabetes, since it is controlled by the same dietetic treatment, and is produced earlier than marked acidosis (6).

Creatine and Creatinine Metabolism.

The creatinine found in urine on a meat-free diet is derived from creatine by loss of a molecule of water; the dehydration takes place mainly in muscle as the following evidence shows: Inanition results show the metabolic connection between the two compounds. High protein feeding causes little increase in creatinine excretion, indicating that it comes chiefly from endogenous sources (the constancy of the creatinine-coefficient in any one normal individual on meat-free diets led Shaffer to suggest that it can be regarded as an index of muscular development). Muscle-creatine varies from species to species; those with muscles richest in creatine show greatest creatinine excretion. Muscle contains not only more creatine than any other tissue, but also more creatinine. The amount of this, though only

between one and two per cent. of the creatine present, is still greater than the creatinine content of blood. Incubation of muscle under buffer-reaction conditions, results in a distinct increase in creatinine content.

There is no definite evidence that creatine is broken down to any other substance than creatinine in the body, nor that it is an anabolite. It cannot be related to urea. *There is as intimate a relationship between muscle carbohydrate metabolism and creatine dehydration as that existing between the catabolism of fats and of glucose.* Apparently creatine-dehydration is required in mammals to bring about some part of carbohydrate metabolism in muscle. The change seems unnecessary merely to facilitate creatine excretion, since that can proceed directly without producing ill-effect, and the solubility of creatine is sufficiently great to permit all the creatine plus creatinine normally excreted to be excreted as creatine.

It is usual to regard creatine as formed in muscle (2). We cannot accept this view. It may be assumed that it is formed at a definite rate in some tissue, such a rate that, with the average musculature of adult man, the creatine is removed by muscle from the circulating blood (if not formed in muscle) and transformed so that the creatinine output is in that constant ratio to body-weight parallel to total musculature that is expressed by Folin's coefficient. In women, with relatively less developed musculature, the muscle mass is only just sufficient and occasionally insufficient to handle the whole of the creatine supply. Part is then excreted unchanged. The stored creatine of muscle may only indicate a certain degree of saturation necessary to produce the effect of a mass action, creatinuria occurring when the supply required for this is exceeded. In children the muscle-mass is also relatively less, there is a constant or almost constant excess of creatine and this is excreted.

Our study of creatine metabolism in R. W. T. furnishes strong evidence that *muscle cannot be regarded as the site of formation of creatine.* His creatinine output is low, corresponding to his musculature, but the total creatine plus creatinine output on a meat-free diet corresponds approximately to the normal creatinine output for a man of his build of correct muscular development. Muscle producing the normal amount of creatine can scarcely fail to convert it correctly into creatinine. Some other body-tissue produces the creatine. R. W. T. is apparently normal, except for muscular development; creatine

can therefore be produced at normal rate. The deficient muscle cannot handle it all; part is excreted. If creatine were formed by muscle, muscle degeneration might lead to increased creatine excretion through unloading of stored creatine. *Muscle-absence cannot do this.* R. W. T. shows absence, not wasting of muscle.

The theory that creatine is formed elsewhere than in muscle agrees with most of the known facts. Creatine content of muscle steadily increases from traces in the foetus to nearly the maximum figure early in extrauterine life (rabbits, chicken, children); there is thus a gradual saturation during development, (probably from without). Adult muscle is almost, but not completely saturated with creatine. This relative degree of saturation is sufficient to explain the failures to observe change after injection or perfusion with supposed precursors. If they give rise to creatine, the supply will be in excess and excreted.

The form in which creatine exists in muscle is unknown. It is usually considered to be in very loose combination, since it can easily be extracted with water, while hydrolysis of the extracted muscle yields no more. It cannot be simply in solution, since then the relative amounts of creatine and creatinine removed by the blood would be determined by their relative solubilities (about 1:7) and the proportions present (50:1). Blood plasma and urine would then contain far more creatine than creatinine.

There is no definite evidence against the view that creatine can be removed from blood by muscle and stored. It necessitates a constant supply in blood-plasma, and a limit below which creatinuria does not occur. Such appears to exist.

Inanition results agree with the theory. Improper carbohydrate metabolism prevents normal utilization, the excess is excreted, but the muscle remains saturated. After nerve-section the creatine content of the affected muscle remains constant until degeneration commences (7). The muscle has ceased to function but remains saturated.

Muscle degeneration results in less total muscle to cope with the creatine supply, less creatinine formation, diminished creatinine excretion, and excretion of the unused creatine of the normal supply, plus that set free in the degeneration. With slow wastage the total output will not be markedly increased. With such rapid changes as occur in uterine involution it is markedly increased.)

Amputation lessens the total musculature; the remaining part cannot handle all the creatine. Creatinuria should tend to diminish as the local shrinkage ceases, *i. e.* in three to four months, but except with men of exceptionally good musculature there may be permanent slight creatinuria if much muscle is removed. While our series of cases is not large, the results are in general agreement. Attempts to calculate the probable creatinine output from the body-weight indicate after recent amputation a creatine plus creatinine output larger than normal, and there is no doubt about the creatinuria. After longer intervals creatinuria either exists permanently or there is a greater tendency to it.

Summing up, it can be said that *whenever the muscle mass is less, or through any cause becomes less than normal, the tendency to creatinuria is increased.*

We have at present no evidence to offer as to the site of formation of creatine. As regards the condition after apoplexy and in those cases (Nos. 9, 18, 19, 20) in which increased tonus without definite muscle wasting is accompanied by marked creatinuria, it may be remarked that increased muscle tonus has been shown to lead to increased creatinine excretion, as contrasted with increased muscular activity, which is without effect. It may be perhaps suggested that with increased muscle tonus since the full activity of the muscles is below normal, there is decreased carbohydrate metabolism in these muscles, in-

volving decreased creatine dehydration, and consequently creatinuria results.

SUMMARY

Consideration of the literature and of the fresh cases recorded lead to the following conclusions:

The occurrence of creatinuria is of little value for diagnostic purposes, but changes in the degree of creatinuria are of some value in controlling prognosis and treatment in certain diseases.

Creatine is converted into creatinine in muscular tissue, this process being necessary to facilitate some carbohydrate change in muscle.

Creatine is not formed in muscle.

REFERENCES

Most of the earlier references are given in the monograph of G. Barger (*The Simpler Natural Bases*, London, 1914) while nearly all the recent papers of importance have appeared in the *Journal of Biological Chemistry*. The following are from other sources:

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Review of the Clinical Significance of the Wassermann Reaction.—The great desire of the medical profession for certain, definite, quick diagnostic procedures ALBERT STRICKLER, Philadelphia, says has caused many to rely on the Wassermann test as a means of diagnosing syphilis, almost, if not altogether, to the exclusion of clinical evidence. As a matter of fact, the Wassermann test should be considered as a symptom and should be impartially weighed along with the other clinical evidence in making the diagnosis. The profession should not attempt to diagnose syphilis on the strength of a single, weak positive reaction. In Strickler's opinion the following should constitute the status of the clinical value of the Wassermann reaction as a diagnostic measure. (1) A negative Wassermann test is the presence of definite

syphilitic lesions is a possibility in certain stages of the disease. This may occur at times in tertiary syphilis, inherited syphilis and also in certain types of neurosyphilis. (2) A positive Wassermann test in the presence of nonsyphilitic disease should not always mean syphilis. It should, however, arouse our suspicion to study our patient from every possible angle in our endeavor to explain this positive reaction. It should be borne in mind that a syphilitic patient is subject to any and all ailments that a nonsyphilitic patient is heir to. (3) While a strongly positive Wassermann reaction in a subject who is not suffering from any illness should cause us to investigate, nevertheless, too great stress is not to be put on it, unless this finding is confirmed by a number of reliable laboratories—*Jour. A. M. A.*, April 1, 1922.

INTRAVENOUS INJECTION OF A NEW MERCURIAL
IN TREATMENT OF SYPHILISW. T. WILLIAMS, M.D., C.M., L.R.C.P. & S. (*Edinburgh*)*Associate Special Treatment Clinic**Toronto General Hospital**Toronto*

RECOGNITION that mercury is an essential adjunct in the treatment of syphilis is, I think, conceded by most authorities. In fact, I am not sure but that it is the essential drug and all others merely accessories. It appears to be true that accessible spirochetes are quickly overcome by the arseno-benzol compounds given intravenously and lesions disappear in a remarkably short time. Nevertheless one never feels sure of overcoming every spirochete in the body without a following or alternating course of mercury. This has been proven time and again by noting a return of the blood to a positive Wassermann, after having become negative, following doses of from one to ten or more of an arseno-benzol compound.

Granted that mercury is indispensable in the treatment of syphilis, the form of such medication is important. Many of the methods at present in use are unpleasant and some of them barbarous. The intramuscular injections of grey oil, mercury salicylate, calomel cream, etc., frequently cause such pain and inconvenience to the patient that they have to be abandoned, while injections are disagreeable, particularly in the warm weather.

During the past two years the writer has been using extensively an intravenous preparation of mercury, called "Mercurosals," during which time a large number of patients have been treated with it. Mercurosals is said to be a synthetic compound derived from mercuric acetate and salicyl-acetic acid and to contain about 44% of metallic mercury by weight. It is put up in the form of powder in sealed tubes, each containing 0.1 gramme and 0.05 gramme Mercurosals. It is very easily soluble in water and the writer's method has been to dissolve 0.1 gramm in 5 c.c. distilled water (sterile) and inject intravenously twice or three times weekly,

depending on the toleration of the patient, from ten to twenty injections as a course. It has been found possible to salivate a patient on one injection repeated weekly over a certain period, but most patients tolerate more frequent dosage.

The advantage of the intravenous over the intramuscular form of treatment is that it is painless, does not leave any disagreeable after effects, absolute accuracy of dosage, and can be continued until your patient is sufficiently saturated. Everyone knows how frequently intramuscular injections have to be abandoned on account of pain, and, if not properly given, by abscess formations and occasionally by such accidents as broken needles caused by the patient suddenly contracting his muscles at the same moment as the injection is given. One case I recall was that of a fairly stout man who was receiving an injection in the gluteal region. He contracted his muscles suddenly at the same instant that the needle thrust was made and fully two inches of the needle was buried in his buttock. The operation required to remove the broken needle caused this unfortunate patient a two weeks lay-up in hospital. Another disadvantage of the intramuscular method is that absolute accuracy of dosage is impossible unless ampules are used. With Mercurosals given intravenously one can be sure of the dosage and also keep an accurate check on the patient. All mouth preparations are uncertain and is left in the patient's hands entirely whether he takes the proper dosage or whether he takes it at all regularly.

A few cases illustrative of the use of Mercurosals, taken from the writer's records, may be of interest.

1.—A. B. Tertiary lues. Wassermann strongly positive. Had four intravenous injections of Diarsenol followed by twenty-one intravenous

injections of Mercurosal. Result,—symptoms clear. Wasserman negative.

2.—Mrs. G. Secondary lues. Pregnant. Wassermann strongly positive. Had ten injections of Diarsenol followed by twenty injections Mercurosal intravenously. Result, negative Wassermann. Baby born six weeks after last injection with negative Wassermann.

3.—Mr. G. Secondary lues. Wasserman strongly positive. Was given eight injections of Diarsenol followed by fifteen injections of Mercurosal intravenously. Result, Wassermann negative.

4.—Mrs. C. Tertiary lues. Wasserman very strongly positive. Given ten injections Sod. Diarsenol followed by thirty injections of Mer-

curosal intravenously. Result, symptoms all clear but Wassermann still positive.

The foregoing results may not be taken as evidences of cure, as all syphilologists are aware that one or more negative Wassermann tests are inconclusive. The cases may be merely in a state of latency, caused possibly by the spirochetes becoming arsenic or mercury tolerant. These may eventually develop into active spirochetes and the patient show a positive Wassermann with recurring symptoms. But the form of mercury given has been shown to be quite as effective as any other form of mercury and with the decided advantages as previously mentioned.

THE PLACE OF DRUGS IN MEDICAL TREATMENT*

D. S. LEWIS, M.D.

THERAPEUTIC nihilism has become such a popular pose, that one almost hesitates to present a paper dealing with drug therapy. It is not difficult to find so-called reasons for the slight esteem in which drugs are held by many practitioners. It is true that many drugs fail to live up to the claims made for them. These claims may arise from well-intentioned but faulty observations, or may result from the advertising campaign of an unscrupulous drug vendor who desires to create a demand for his products. The rise of faith healing and other cults has shown that many disturbances may be cured without drugs, and finally the great importance attached to the pathologic anatomy of disease, as Barker (1) states, has turned our "teaching hospitals into diagnostic institutes rather than institutes of therapy." In other words our teaching system is also to blame for a considerable degree of ignorance regarding the application of drugs to treatment. Certain of the objections are just and reasonable: many diseases are self limited, or are relieved by the body's own powers of resistance; others may be treated more easily by a regulation of the diet, by hygienic measures, by

psychotherapy and so on, but there are many situations which can be met only by the accurate and fearless use of drugs.

It is now felt that we are on the threshold of great advances in drug therapy. As never before we are developing co-operation in our attack on the problem; the chemist is devising new combinations which will retain the favourable action of our present drugs without their objectionable features. The pharmacist is producing better preparations with more regular standards of strength, while the pharmacologist and clinician are engaged in accurate observations of the physiological action and toxicity of the newer drugs, and the effects of these drugs, not on laboratory animals, but on the actual disease process which the drug is designed to benefit. As Barker (1) says "Clinicians have wisely seen that the pharmacology of the laboratory, though of great value to the general advance of scientific therapy, cannot take the place of accurate clinical observation. . . . The final and crucial test of the value of any therapy is that of actual clinical experience." Rowntree (2) makes a similar statement: "In the use of drugs the general practitioner is the final court of appeal."

*Read before the Montreal Medico-Chirurgical Society. March 17th, 1922.

Turning to the drugs actually at our disposal, how may we best apply them to the treatment of disease? There are three essentials in the successful use of any type of therapy. *First* an accurate diagnosis of the type of lesion present, and of the particular function of the body upon which the stress of the disease is falling. *Second*, a quantitative diagnosis as McCrudden calls it. How seriously is the organ damaged or its function disturbed? This is an essential point if we are to make an estimate of the response which we are likely to obtain from our treatment. *Third*, a thorough understanding of the effects which our therapy will have on the disease process, and on the particular function which is the seat of the main disturbance. The accurate and successful use of drug therapy will therefore depend on a careful diagnosis, a knowledge of the action of drugs, and a close attention to the amount of the drug necessary to attain the desired result.

A large proportion of useful drugs may be grouped under three heads: *first*, those which act directly on the cause of the disease; *second*, those which tend to correct and restore disturbed function, and *third*, those which control symptoms.

1.—*Drugs which act directly on the causes of disease.* These are generally spoken of as the specific drugs. They are relatively few in number, but as science progresses their number is being increased. The best known examples are quinine with its action on the malarial plasmodium, mercury and the organic preparations of arsenic which have proved so potent in combatting the spirochete of syphilis, certain other arsenicals of the atoxyl group with their action on the trypanosome of sleeping sickness; emetin the active principle of ipecac, which has done so much to rob amœbic dysentery of its terrors; tartar emetic which has proved that bilharziasis is no longer an incurable infection, and finally the anthelmintic drugs.

True they all act on protozoal types of infection, but they are definitely parasitotropic in most cases: that is they are more toxic for the parasite than for the host. There is hope that in the future we shall have such preparations for use against bacterial infections. At present we have one such drug, optochin, which is closely allied to quinine, and which has a definitely toxic action on the pneumococcus both in the test tube and in the body. Unfortunately it also has a great tendency to produce optic neuritis and blindness, and so cannot be used in practice.

Atoxyl had similar defects, but chemists have developed new compounds which are just as toxic to the trypanosome, but without the action on the optic nerve. Is it too great a flight of the imagination to predict some such development in the case of optochin as well?

2.—*Drugs which tend to restore and correct disturbed function.* This group contains many of our most used drugs, the best examples being digitalis, the nitrites and adrenalin.

Digitalis is a drug of the first importance, and the history of its introduction to the profession by William Withering of Birmingham is a very tangible example of the part played by careful clinical observation in the study of the action of drugs. Mackenzie recently stated that most of the clinical pharmacology of digitalis was contained in Withering's account of the drug published in 1785. The effects of the drug, its proper dosage, and the signs of its toxic action are set forth with surprising clarity.

The pharmacologist states that digitalis stimulates the heart muscle, slows the pulse, and raises the pressure, but in actual practice one notices certain variations from the laboratory findings. Digitalis has a marked effect on the heart muscle, it causes a more forcible and complete contraction, and assists in the production of that hypertrophy which is so necessary to overcome the mechanical difficulties of incompetent valves, as well as the more serious results of a damaged myocardium. Its effects on the pulse rate vary greatly with the type of heart lesion. In auricular fibrillation it slows the pulse and heart rate to a remarkable degree by interposing a block between the auricles and ventricles; but in the regular heart Christian points out that one can have all the evidences of the favourable action of the drug without any change in the pulse rate. So also the feeling is still quite general that a high blood pressure contraindicates the use of digitalis, because, in the laboratory, digitalis causes a considerable rise in the pressure. It remained for Mackenzie, Price and others to show that it did not cause any such rise in the treatment of cardiac disease. It is now recognized that digitalis tends to bring the pressure to the most efficient level in each case. If the pressure be unnecessarily high it will fall with a return of compensation under the influence of the drug. If the pressure be too low it will often rise, but never to a dangerous extent.

One frequently hears of digitalis failing to give the expected results. Pratt states that this

is nearly always due to too small dosage, or to an inactive preparation. Preparations of digitalis do show large variations in their potency, and Lewis and Moffatt have recently found that only about two-thirds of a series of preparations sold in Montreal came up to the accepted standards. If one fails to get results with digitalis in a suitable case it is always good policy to change the source of supply and give the drug a further trial.

Quinidin also affects the heart in a remarkable manner. In auricular fibrillation it actually re-establishes the normal rhythm of the auricles in about half the cases. Its action, however, is not without danger, and the time has not yet come for its introduction to general use in the profession.

The *nitrites* are another group of drugs exerting their action on the circulatory system. The effects of a tablet of nitro-glycerine dissolved under the tongue during an attack of angina pectoris are too striking to be easily forgotten. This mode of administration is a convenient and efficient one, and does away with the added emotional strain of having to inhale amyl nitrite in public. The nitrites may be used also for the prevention of anginal attacks. Following the use of nitro-glycerine the patient is frequently able to go through exertion which would precipitate an attack if he were not protected by the drug.

Adrenaline. The relief which follows the hypodermic injection of adrenaline chloride in bronchial asthma is one of the most dramatic examples of drug efficiency. Almost immediately following the use of from five to eight minims of the solution (1:1,000), there is a relaxation of the bronchial spasm and the patient is made practically free of symptoms. Cases which previously required from one quarter to half a grain of morphine for a tardy relief may now be made comfortable in a comparatively few seconds. True, the relief is only of a temporary character, but it enables us to control the seizures while a search is being made for the causative agent by means of the skin tests. Even if we are unsuccessful in this quest, we still have the drug to fall back upon, as the effects are often preserved over long periods of time.

Adrenaline may also be used to control the urticarial eruptions which occasionally follow the use of foods to which a patient has an idiosyncrasy. In these cases a single injection is often followed by prompt relief.

The effects of these drugs and of many others

which might be referred to, are so striking that every physician must admit that drugs have a definite place in our therapeutic armamentarium.

3.—*Drugs which affect symptoms.* Finally the use of drugs to combat symptoms is perhaps one of the most unsatisfactory from the scientific aspect, but still a necessary one from the practical view point of the relation of the physician and patient. Naturally the patient looks to medical treatment for one of two results: a cure of his complaint, or a palliation of his suffering. In most cases these symptomatic drugs should be employed merely to carry the patient along until surgical or medical treatment can be directed towards a removal of the cause. Morphine and opium have a definite place in the relief of renal and of biliary colic, but surgical treatment is the rational mode of cure. Macht's work on the opium alkaloids has shown that certain of the less used members of the series have a greater effect in spasm of smooth muscle, than has morphine, and it is possible that in certain cases of ureteral calculus, and in the passage of small plugs through the biliary tract, papaverine may eventually supplant the more frequently used morphine. This possibility receives support also from the well known fact that pantopon, a mixture of all the opium alkaloids, is more efficient in the relief of these seizures than is a corresponding dose of morphine used alone.

Codein in the dry cough of tracheitis and laryngitis is almost a specific drug. Here we have a vicious circle; the inflammation of the respiratory mucus membrane causes the cough and the cough aggravates the inflammation. If given in sufficient doses to depress the respiratory centre and stop the cough, codein breaks up this vicious circle, and allows of a natural healing of an undisturbed tissue.

The analgesics also have their use in the relief of headache and the lesser pains of peripheral neuritis, but they should be used as temporary measures. We should make every effort to identify and treat the cause of the disorder. It is an obvious prostitution of drug therapy to treat a sciatica of diabetic origin by the use of drugs alone. Dietary regulation will usually control the pain, and will tend to improve the patient's general condition. So also the headaches arising from errors of refraction, from chronic sinusitis, or from the more serious causes, brain tumour, abscess, or syphilis, should be treated through their several causes, and not symptomatically.

In conclusion, if we keep in mind that the secret of successful treatment lies first in an accurate diagnosis of the nature and severity of the disease process, and secondly in a wise application of therapeutic measures to meet the conditions which are present, we shall be well on the road toward the proper goal of medical treatment. We will adopt not an attitude of nihilism but rather one of confidence in the drugs

which we employ. We may not employ a multitude of these remedies, but we will have a goodly number of trusted aids, which will rarely forsake us in our fight against disease and suffering.

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CAESARIAN SECTION*

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IN the 80's of the last century when Sanger introduced the stitching of the uterine wound it may be said that Caesarian section began to find a place in surgery. About the same time in Great Britain, Murdock Cameron published several successful cases. But, at that time, the only indication for which it was performed was contracted pelvis. In 1898 the resourceful mind of the great Tait urged its performance as the proper method of dealing with Placenta Praevia.

Early in this century severe eclampsia was considered another indication. At the present time the indications for Caesarian Section, besides those above-named, embrace the following other conditions, namely, tumours, impacted shoulder presentation, abnormal conditions of the child, undue rigidity of the cervix and vagina, grave diseases threatening the life of the mother and some cases of prolapse of the cord. My own experience in Caesarian section is limited to eclampsia, placenta praevia and failure of the head to engage in the pelvis in a primipara.

ECLAMPSIA:

I will briefly relate four cases and follow with some observations.

(1) In 1910, Mrs. H., primipara—Since early in fifth month she showed albuminuria and oedema. The usual treatment including saline purgation, rest in bed and milk diet failed to benefit

*Read at the December Meeting of the Guelph Medical Association.

her and by the end of the eighth month her condition had become critical. Enormous oedema, the urine scanty and loaded with albumen. In October, 1910, in the Guelph General Hospital and about three weeks before term Caesarian section was successfully performed. Mother and child lived. Patient left the Hospital on the seventeenth day. Urine abundant and free from albumen.

(2) In 1913, Mrs. R., primipara—Admitted to St. Joseph's Hospital in the eighth month. Albuminuria since the fifth month and great oedema. Convulsion about three weeks before term. Caesarian section was performed. Mother and child both survived, leaving the Hospital in good condition in the third week.

(3) In 1913, Mrs. R., primipara—Very little oedema but albumen present. Convulsions about end of eighth month. Caesarian section—child lived, mother died on 3rd day from Septic Peritonitis, caused by a pus tube.

(4) Mrs. Y., primipara—Admitted to St. Joseph's Hospital Sept. 1st, 1920. Albumen from fifth month, considerable oedema. Next day, convulsions occurred. Four before operation and four after. Caesarian section—Mother and child recovered. The albumen slowly disappeared but the Sp. Gr. never rose above 1014, generally 1010 or below. This woman was delivered on January 11th, 1922, of her second child. Chloroform and forceps required as the labour was difficult. No trouble arose from the previous Caesarian Section.

PLACENTA PRAEVIA—Two Cases

(1) In November, 1919—Mrs. McL., age 37, Guelph General Hospital. One boy, age nine. Had several sudden attacks of haemorrhage, the last severe, about the end of the eighth month. Caesarian section. Both mother and child recovered. In this case the mother was able to nurse the child.

(2) Mrs. H.—Fourth Pregnancy—(March 21st) St. Joseph's Hospital. A low lateral implantation recognized. Several haemorrhages. Caesarian section. Both mother and child recovered. The child about seven months. After the removal of the placenta a large fibroid polypus was found attached by a pedicle, about an inch in diameter, to the lateral aspect of the uterus. This was excised and the pedicle ligated. The presence of this large tumour in the uterus led to the belief that the term of pregnancy was more advanced than was found.

In a primipara, and in all patients with a small pelvis, and in every case if the haemorrhage is severe, I have no doubt that resort to Caesarian section is the safest method of procedure in placenta praevia. In a multipara with a roomy pelvis and the os soft and dilatable, the membranes may be ruptured, through the placenta if necessary, and turning may meet the condition and save both mother and child without section.

In some 12 cases of placenta praevia, of which I kept records, treated many years ago, I think all the mothers but one survived; of the children all died but one. The methods as then practised were carefully followed. Plugging and often re-plugging the vagina, and turning when possible in multipara, but labour was concluded by some method as soon as possible. What anxious hours for the Doctor and the friends!

Contrast: The condition of the patient who undergoes Caesarian section. Patient is prepared in Hospital. In 35 or 40 minutes she is back in bed. Mother and child practically out of danger and a strong probability that the mother will be able to nurse her child. In the old way generally one life, rarely the two, was saved after a desperate fight, lasting sometimes a day or two. By Caesarian section, after mature consideration, prompt decision and immediate action, all anxiety is practically removed in one hour.

As to Eclampsia—Four cases are here reported and one death which was not due to the Eclampsia or the operation but to a pus tube, no doubt disturbed by the operation as it would probably

have been by the occurrence of labour. All the children recovered though three of the number were premature, one being a seven months child. Looking over my old reports of cases of puerperal convulsions I find a report of 17 cases. Four mothers died from uraemia and all the children except where the convulsions occurred post partum. Many were premature and so toxic from the mother's condition that they were stillborn, or died a few hours after birth.

To some of these 17 cases I was first called when the convulsions had already set in. In those cases I resorted to early venesection and the use of Morphia, Chloral, Bromide or Chloroform as might seem indicated. When the patient was conscious I always had the bowels acted upon promptly by Calomel, Salts, and once by Croton oil.

When under my own care from the fifth or sixth month, with albumen present, and more or less oedema, the usual measures, such as rest in bed, warmth, saline purgation and milk diet were carried out carefully. In many such cases they went to full term without convulsions. Others went on to the seventh or eighth month, so that if it became necessary to terminate the pregnancy the child was viable.

It remains to relate a case submitted to Caesarian section because the head failed to engage properly in the pelvis. Mrs. B., primipara. In October 1913—My son, the late Dr. Kenneth, was called. He found sufficient dilatation, and under anaesthesia and with antiseptic care he was able to get the forceps properly applied. After failure, by use of reasonable force, to advance the head, I was asked to assist him. The friends were advised that possibly forceps delivery might succeed but that it involved great danger to the child and possibly severe injuries to the mother. She was removed to St. Joseph's Hospital and the operation of Caesarian Section was accepted by her and her friends as involving less danger. Mother and child left the Hospital in excellent condition on the sixteenth day after operation. Let me add that it was my privilege to attend this woman two years later with her second child which was delivered naturally and without instruments and that she made an excellent recovery—thus showing that the uterine wound in her case had healed so firmly as to give the uterine wall its full normal strength. If we could feel sure of such a result in every case, in this day of excellent hospital advantages, how very many cases would we submit to Caesarian sec-

tion. rather than deliver by the vagina with severe injuries to the mother and the probable death of the child. In my own experience I can recall many difficult instrumental labours. Too often in these bad cases the child, if not still born, died within a few hours or days after birth and the mother was so injured as to require considerable repair to make life tolerable.

Can we close that uterine incision so perfectly that the wall will regain its normal strength? If we can, we may extend the use of Caesarian section immensely.

In all my cases I have been extremely careful to procure exact co-aptation of the edges of the incision and I use 5 Chromic cat-gut No. 2, stitches in every 2 inches. I use a rounded curved needle which enters $\frac{1}{4}$ inch from margin of incision and takes a large bite emerging at the mucous layer. On the opposite side, re-entering at the mucous membrane and going into the uterine wall so as to include a large mass it emerges $\frac{1}{4}$ inch external to the other margin. I have seen a suggestion to lift the peritoneal covering of the uterus a distance of $\frac{1}{2}$ inch on each side of the whole length of the incision. In my judgment it is a useful hint and will make a perfect closure of the incision much easier. This will greatly aid in preventing the possibility of intestinal or parietal adhesion to the incision.

At the last meeting of the British Medical Association, two excellent papers on this subject were presented; one by Dr. Munro Kerr, Prof. of Obstetrics and Gynecology, Glasgow University, on the indications for Caesarian section and another by Dr. Eardly Holland of the London Hospital on the methods and technique of Caesarian section. These papers were followed by a discussion in which a large number of the most able obstetricians in the British Empire took part.

TECHNIQUE

Suture—Material. Dr. Holland advised silk worm gut as the best, silk next best and he considers cat-gut as most unsuitable. I have used Chromic cat-gut No. 2 in all my operations, but I recognize that the few cases I have had do not entitle me to speak with any authority. I may intimate that nearly all British Surgeons are not in favour of the use of cat-gut, especially in abdominal work. Possibly the cat-gut in the damp climate of Great Britain does not keep so well. I can see that the use of silk worm gut or silk, being practically unabsorbable, might lead to trouble. In one case some years ago I had to re-

move a buried silk worm gut suture several years after operation. The sutures should be interrupted, 5 in 2 inches, that is not more than 2-5 of an inch apart. The best needle in my judgment is a fairly large curved needle with a round point. It should be so used as to take a large bite of the muscular wall on each side of the incision. There should be no hurry as it is essential for the future welfare of the patient that the co-aptation should be as accurate as possible. Then the suggestion made by Dr. Holland that the whole line of incision should be completely covered by the peritoneum is worth keeping in mind.

Dr. Holland collected records of about 4,000 cases of recent Caesarian section; of this total 3,374 were performed for pelvic contraction.

The maternal mortality of 1,953 he classified thus:

	No. Cases	Deaths	Percentage
Not in labour	1202	19	1.6
Early in labour	389	7	1.8
Later in labour	224	24	10.3
After induction of labour	35	5	14.0
After attempts at forceps delivery	103	28	27.0

Cause of death in 124 cases was given as follows:

Peritonitis	50
Septicaemia	27
Pneumonia	15
Embolism	9
Haemorrhage	8
Intestinal Obstruction	5
Cardiac Failure	9
Illeus	1

In the discussion in the British Medical Association to which I referred, the necessity of great attention to the perfect closure of the incision was emphasized. So many of the cases are quite young, generally first labours with pregnancy liable to follow soon again, that several advocated sterilizing the mother at the time of operation to avoid the danger of sudden rupture of the uterus in a subsequent labour as has happened in about 4 per cent. of cases earlier reported. The uterus about to undergo subinvolution and contracting intermittently for several days, from the recurring after-pain, is certainly far from being in an ideal condition for the primary healing of the incision. However regrettable, it would be wiser to sterilize the mother, than that she should lose her life from shock and haemorrhage if rupture should occur from an imperfectly healed incision. With great care in closing the incision I have good hope that such danger can be avoided. Until I see a stronger reason I will not sterilize any mother on whom I may operate.

It will be seen in the Table above given that the mortality in cases after attempts at forceps delivery was very high: 27 per cent. In one of the cases here reported attempts at forceps delivery were made by my son and myself—and afterward the patient was removed to the hospital. Her recovery could not have been easier or more absolutely normal. I feel, therefore, that even if efforts at forceps delivery have been made, if these attempts were made with reasonable antiseptic care and good judgment, we have the right to expect a successful result by Caesarian section.

Since this paper was written I attended another of these cases. The labour commenced at full term and the membranes ruptured spontaneously almost at the beginning.

In fourteen hours there was full dilatation and the head engaged in the pelvis. Chloroform was used and assistance by the forceps given to deliver the head. In this patient it seemed clear that the uterus had regained its full normal strength. The pains were very strong, regular and quite effective. She made a good recovery from her labour.

THE X-RAY EXAMINATION*

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IN order to comprehend the subject it is well to recall that the x-ray examination depends on definite changes brought about by the invasion of the lung substance through the entrance of the tubercle bacillus, causing a reaction by a round cell invasion at the site of lesion, followed in favourable cases by the formation of fibrous tissue and calcification or, in unfavourable, by consolidation, cavitation, etc. The ray may be considered as a light wave which travels in straight lines, and, according to the resistance of objects encountered will penetrate in varying degrees. Therefore, in accordance with the underlying pathological changes, the plate will always show these differences of penetration; in the form of slight flocculent shadows from cellular change, in dense shadow from consolidation and calcification, and where lung substance is destroyed and therefore no resistance is encountered, by increased translucency. One great difficulty arises in distinguishing between the changes wrought by round cell invasion and those by early fibrosis. This latter point is crucial as herein lies the impossibility of distinguishing between activity and healing. The later shadows cast by the production of firm fibrous bands and calcification generally offer no great difficulty as their sha-

dows are quite definite and can readily be differentiated. The x-ray examination, therefore, fundamentally differs from the auscultatory as the latter depends upon sound waves which follow the lines of least resistance and will travel through a tube no matter how tortuous. Hence the slight changes brought about by cellular invasion, while probably being present, are dispersed through lung tissue sufficiently to make them inaudible at the chest wall. This differentiation from the standpoint of physics undoubtedly explains a great many discrepancies between the x-ray and the physical examination.

Remembering then that the changes, as shown upon the plate, are based upon a physical basis, we have another means of studying the pathology of pulmonary tuberculosis. We have the opportunity of observing a given case from the time of presentation through all its varying phases. This opportunity, if developed by serial plates over a period of months, would undoubtedly unveil a mine of valuable information and so fill the gap between the early clinical case and the post mortem. That the changes shown upon the plate can be relied upon has been abundantly proven by the anatomical studies of Miller, Dunham and others, and the post mortem studies of Ghön and Opie, the two latter working in different countries arriving at conclusions which verify the radiographic aspect of tuberculosis. At the present time it is generally agreed that we

*Being part of a Symposium on the Diagnosis of Pulmonary Tuberculosis. Other papers will appear in next issue.

are able to distinguish three radiographic types of pulmonary tuberculosis.

Hilum Tuberculosis is usually found in children under eleven, associated with a definite chain of symptoms indicative of a tuberculous invasion (cough, rapid pulse, slight evening temperature, child is less active, tires easily, physical signs may or not be present, tuberculin test is positive). In this class the roentgenogram will show an increase of shadow more or less woolly round the *hila*. Later this invasion will be overcome, followed by healing and so presenting the very common picture of marked calcification so often met with in adult work. Although nothing distinctive may be present before calcification, yet if one carefully examines the plates, one can always find a definite localized peri-bronchial thickening and branching, extending from the lung substance to the *hilum*. The *hilum* changes are however, the more prominent. This is in agreement with the excellent work of Ghén who found that, although the primary pulmonary lesion may be slight, yet the more marked reaction will be at the *hilum*. The radiograph has its value in these cases by showing the prominent *hila* changes. The differential diagnosis is made by the clinician who by the aid of the plate is able to see the seat and extent of the lesion.

Peribronchial Infiltration. This type is usually localized to the upper regions and is characterized by fine peribronchial markings, fan-shaped, extending from the peripheral portion to the *hilum*, and studded by round, more or less small whitish nodules. *Hila* shadow changes in varying degrees are always present. While this type usually shows a more or less disposition towards local prominence it may be general. Peribronchial tubercle is not likely to give physical signs unless generalized. The x-ray in this class is of extreme importance as otherwise there is no way of determining the extent or location of the disease which, if undiscovered, would undoubtedly lead to extensive involvement before detection.

Parenchymatous Infiltration. This class is often spoken of as being typical of tuberculosis. It is characterized by the presence of small whitish, more or less discrete shadows, localized over small or wide areas, appearing in the upper chest, in the region of the bronchioles. Peribronchial markings are usually seen connecting these shadows with the *hilum*.

Cases undoubtedly occur which follow one or other of these forms. Many, probably the majority, show evidence of all, with one type pre-

dominating. While one cannot enter upon the theoretical points on which one bases the opinion that pulmonary tuberculosis is present, in general it may be stated that it depends upon our knowledge of the pathology of pulmonary tuberculosis and, therefore, the grouping and location of these shadows, especially when localized or pronounced in the upper chest and if associated with such conditions as cavitation, fibrosis and calcification, etc. it makes a diagnosis fairly certain.

Cavitation. Cavities are more or less annular and are always accompanied by lung destruction surrounded by a zone of infiltration which is shown on the plate by a shadow of varying density enclosing a space in which lung markings are absent, differing materially from localized pneumothoraces, as described by Brown, which while annular in shape, enclose an area containing lung markings, and when studied over a period of time, may entirely disappear. Often on one examination the two types are extremely hard to differentiate, but if kept under observation the difference can usually be demonstrated. A true cavity can always be detected unless obscured by some overlying shadow, such as that cast by fluid etc.

Fibrosis. The formation of fibrotic tissue in an area which as a result of either chemical or physical means has undergone destruction is the normal response towards repair. It would, therefore, be very difficult unless other evidence of tuberculosis be present to distinguish between a fibrosis due to the invasion of the bacillus tuberculosis or other microbic organisms. That this is true has been demonstrated by many observers. It has been noted in cases of dust inhalation by Pancoast who found in borderline cases apical changes quite similar to tuberculosis. Again cases of pneumoconiosis are liable to be complicated by an engrafted tuberculosis which renders the picture much more difficult if not impossible to distinguish. A more recent pulmonary condition has been noted in chests of soldiers who were subjected to gas inhalation. This results in destruction of the epithelium lining the bronchi and finer branches, although it may be too early to speak with certainty it is worthy of note that in this class, changes which resemble a peribronchial tuberculosis have been observed, the difference being that the changes due to gas are more general and bilateral and do not show the same amount of studding. The *hila* and lower lobes usually show a marked amount of shadow but borderline cases do occur and these are ex-

tremely difficult to differentiate. It would therefore seem fair to conclude that when fibrosis is present a thorough history of the case is essential before an opinion should be asked or given. The value of the radiograph lies chiefly in the fact that it localizes and gives an idea of the total amount of fibrosis.

Activity. It is a debatable point as to whether activity or inactivity can be shown upon the plate. We are of the opinion that it cannot. Chronicity on the other hand can be fairly established by the characteristic shadows of dense fibrosis and calcification.

Comparing these types with the clinical cases we find that fever, pleurisy, and general symptoms are found in both the parenchymatous and peribronchial in equal proportions. The peribronchial type usually has few physical signs, the parenchymatous type gives many. Haemorrhage, sputum, tubercle bacilli, moist rales, etc. are found most frequently with the parenchymatous.

Classification. Important as it is to show which type of tuberculosis is present, it is probably more important to be able to state definitely the extent of the lesion. Recalling the introductory remarks, we will remember that the extent of the lesion will always be shown. This ability to classify a given case has at last become a recognized procedure. Nowadays no case should be classified from the history and physical examination alone, but only in conjunction with the radiographic, when it will usually be found that the disease is more extensive than thought from the clinical examination and further, it will be seen that tuberculosis is rarely unilateral. One side may show a predominance but both will show evidence of tuberculosis. Brown, Heise, and Sampson in a series of 814 cases showed that 48% were farther advanced than suggested by the physical examination. They, therefore, concluded "That the classification based primarily upon the extent of pulmonary disease should rest not only on the notoriously uncertain physical signs but also upon the extent of the disease as shown by the x-ray plates." To illustrate this point more fully two cases recently observed showed a slight rise of temperature on exertion, inability to perform light work without a sense of tiredness out of proportion to the energy expended, their weights were below par. The physical examination was not definite in either case yet in both the physician was confident that pulmonary tuberculosis was present. Clinically they were classified as minimal. The x-ray

examination showed very slight and early peribronchial changes in one, while the other showed a marked bilateral peribronchial involvement demonstrating that the patient had long since passed the minimum stage.

That the ability to demonstrate the total involvement is important from the standpoint of prognosis and treatment is well recognized, especially so if operative procedure or pneumothorax is contemplated, as the condition of the least involved lung must be known especially so as the life of the individual will depend entirely upon its ability to perform the function of respiration. It is also important to know the condition of the diseased lung in order to estimate the probable success of obtaining collapse, and after collapse has been obtained the physician has then an excellent means of studying subsequent developments and so altering his procedure as circumstances arise.

At the present time there are two distinct parts of an x-ray examination—first the fluorescent screen and second the stereoscopic plates. From the screen examination gross lesions, such as large areas of consolidation, cavity formation, mediastinal glands, displacement of organs, and movement of the diaphragm can be well demonstrated. It also affords an excellent guide as to the lung collapse in cases of pneumothorax. It should never be relied upon for finer lung detail and as the diagnosis so often depends upon the ability to demonstrate these slight changes, plates must always be taken. The use of the single or flat plate should only be mentioned to be condemned. It will give very little accurate information. While this is probably obvious to a great many, yet it is of extreme importance because at the present time too many rely upon the screen and single plate. This use has undoubtedly led to many serious errors and so casts discredit upon the examination. In early cases no opinion should be given from a screen examination but only after careful study of the stereoscopic plates. Whether or not the proper interpretation is made is another matter depending as it does upon the knowledge and skill of the roentgenologist who must be trained in the science of medicine, without which he is a mere technician and cannot give an opinion of any greater value than could be obtained from a physical examination by one untrained for such an undertaking. The full value of the examination will only be realized by the roentgenologist having a full knowledge of the history, clinical and labo-

ratory findings. This can only be accomplished by co-operation between the radiologist and clinician, which is doubly essential in all borderline cases, as markings quite similar to tuberculosis can be obtained secondarily to upper respiratory disease or to such conditions as produced by the inhalation of dust or other foreign bodies encountered in various spheres of life, and not until this co-operation is more fully developed will the patient derive the benefit from the examination to which he is entitled. It is a common experience to have a patient referred for x-ray examination of the chest who has never been examined physically. This is wrong. In all cases the physician in charge should make a thorough examination before recommending further investigation. There is no doubt that the x-ray examination of the chest fulfills a long felt want. It does not supplant the physical examination. It complements it. There should

be no discussion regarding their relative value for both have their place.

Lately there has been a tremendous increase in the number of men doing x-ray work which in itself is a favourable sign, but may we add a note of warning? X-ray interpretation requires study and before any person attempts to give an opinion he should have spent considerable time with an experienced roentgenologist of recognized ability. The mere purchasing of a transformer in no way purchases the ability to interpret the plate. In our experience one of the most difficult problems with which we are confronted is to give a well balanced opinion in cases which might or might not be early tuberculosis. We do not wish to discourage but urge those entering the field of roentgenology that if they will make it a matter of serious study much valuable knowledge will be gained.

THE NEW ORDER*

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THE doctrine of free competition has been summed up in the phrase, "Each for himself, and the devil take the hindmost." All epigrams are a little unfair, and this is not an exception to the rule. But if it does unfairly sum up the thought of Cobden and Bright and Mill and Gladstone, it also presents briefly and vividly the lasting impress of their doctrines, which the British man in the street retains today. His father may have looked on Bright as a prophet, and believed in competition for humane and social reasons. But the living Englishman of this generation reacts not toward, but away from it. He no longer believes that competition is an automatic safeguard of each man's private interest. He now holds a different social ideal, and looks elsewhere for security.

In striking contrast to the great reaction against individualism, which has been gathering force for many years, in Europe, the educated American, who for a long time was free from

the trammels of social philosophy, now begins to find a good deal of comfort in these old individualist principles. Their working is to be seen in many walks of life. Anti-trust legislation has generally rested on a glorification of free competition. The great campaign speeches of Mr. Woodrow Wilson, which have been published under the name of "The New Freedom," are instinct with the notion of giving free play to the great creative energies of America, by restoring free competition. The big drive which is now being made by the most powerful heads of American business, in favour of the "open shop," undoubtedly rests, in the minds of many who support it, on grounds of selfish interest—on substituting for the shop closed to non-union labour a shop closed to members of trade unions. But besides shortsighted and selfish supporters of the movement, there are many more whose vindication of the open shop—a shop (in their minds) open alike to union and non-union workmen—rests on the purest principles of individualism. For all the difference in experience which lies between these

*An address before the Round Table of the Ontario Medical Association.

men and the great political thinkers of the nineteenth century, their views are not so far apart.

Now the contact between ourselves and the thinking public of America is very close. So long as we share the same language and literature, read the same press despatches, lead the same kind of life and meet the same kind of problems, it must be very close. I suppose our gathering here for this meeting is a recognition, in a sense, of our closeness, for I know that there are many members of the medical profession in New York State, who take a keen interest in the Ontario Medical Association. Any drift of thoughtful American opinion (such as, I believe, exists in favour of perpetuating the system of free competition on which modern industry was founded) has a very direct bearing on us and our future, whatever vocation we may follow.

One outstanding mark of a belief in free competition is its conservatism. I mean, conservatism with a little "c;" not political conservatism, which is sometimes merely radicalism in disguise, but the conservative instinct that wants to preserve existing institutions. The competitive system is our legacy from the Victorian era, which swept away so many boundaries and broke so many shackles. Its permanence would help to make permanent our present order of society. In its permanence, therefore, are interested all the large number of small property holders, who having done pretty well under the present regime, are not quite sure that they would do equally well, if some other were to take its place. "Where your heart is there will your treasure be also."

But the mere fact that large numbers of people are in favour of preserving an existing system, will not alone preserve it. Large numbers of people once supported chattel slavery—the right to wage private warfare—the guilds of the middle ages—and the stage coach—but all of these perished long ago. Most human institutions barely ripen to maturity before the conditions that produced them are profoundly modified. Almost as soon as men's minds have got used to them, they begin to be replaced. We are bound, if we have any scientific temper, to recognize that it is far less natural for human institutions to crystallise, than it is for them to change. No matter how closely our chief interests may be bound up with the present, it is

well in any contemplation of the future to recognize the probability of change.

To this is not to commit one's self to definite forecasts of the future. The world is already too full of prophets. Communists, socialists, guild socialists, novelists, clergymen, biologists; the world is full of people who can foretell exactly the lines of evolution. We may conclude with a good deal of reason that all of them are likely to be wrong. For whenever great changes have come upon us in the past, they have come like a thief in the night. They have often been explained successfully, but only some time after their arrival. There was a time not long ago, when a certain type of soldier claimed after each retirement that "he made it according to plan." But if it is so that men retreat, mankind *advances* in another way. Change as a rule bewilders us exceedingly.

The more a man appreciates how complex are the forces, through whose interaction change occurs, the less is he likely to have a taste for dogmatic speculation. But if, like Balaam, he declines to prophesy, he need not refuse to think about the subject. He can at least look at some of the forces which are at work around him.

One of these, whenever it exists, is a great experience shared in common, by a generation of men and women. And since the war did, in an extraordinary manner, unite more than twenty millions of men in a common experience of military service, I would like with your permission to dwell for a few moments on our possible heritage from this experience.

Generations hence, men will still be trying to sum it up in a formula—to find the measure of experience common to young and old, combatant and non-combatant, vanquished and victor—to all who were drawn into the maelstrom of the war. A wonderful difference of temperament separated the man who liked fighting—a rare bird but one not yet extinct—from the chocolate soldier, and both from the married man, whose one ambition has been well expressed by Kipling:-

" 'E wants to *finish* 'is little bit,

"And 'e wants to get 'ome to 'is tea."

There will be many who fail to see that these had anything in common. Other observers have studied at first hand the healing genius of memory: how Nature sifts our past impressions, and often consigns the most painful of them to

oblivion, causing us to remember only those whose recollection is a pleasant thing. They may be inclined to doubt whether the men of our generation will as a body carry with them any coherent memory which dominates their thought on social questions.

If the judgment here expressed is at variance with theirs, I can only say that it was not reached as the result of any process of logic, or on the basis of a definite collection of evidence. But it is the result of an honest effort to gain a general impression, from men who served in several armies and in many regiments, who sometimes formed no very clear opinions, and often could not state them clearly.

I believe that the men who came back from the War, were imbued fairly deeply with three main impressions, which will influence their thinking everywhere. In the first place, they had seen—often for the first time—the power of organized effort. They had seen with how small an expenditure of energy the daily life of a thousand men can be conducted, if each man plays his proper part. They had seen troops assembled in enormous numbers, from different places and by different routes, often without mishap, and sometimes without loss of time. They had seen how small a force of men, armed and disciplined, is required to control a large mass of unarmed and unorganized civilians. They came back with a belief in organization, which is attested by the demand of the returned soldier for education, (that is, for organized knowledge,) by the growth in numbers of the trade union movement, by the readiness of men to put themselves under discipline for purposes which they support.

In the second place—if I am not mistaken—they came back with a new dislike of interference by the state. At the best of times we have seldom treated the state as an equal. Some of us have regarded it as an elderly grandparent—some as a grandchild needing careful guidance—all of us as if it were something of a nuisance. But to the soldier it was an infernal nuisance. It had decided what he was to wear, and how he was to wear it—what he was to eat and how much—when he was to get up and when to go to bed—when he might go home and how long he might stay there. No man who has not experienced the freedom of being a civilian, after being for months or years at the call of a sergeant, can realize completely what that

freedom meant. In proportion as men had grown tired of listening always for the word of command, they came back determined to live out the balance of their lives in their own way. Organization they believed in, but it was to be their own organization, and not one imposed upon them.

And in the third place, was not the outstanding lesson of the war, at least for those who took part in it, a lesson in human decency? The millions of men who served, volunteer and conscript alike, enlisted as a rule in the spirit of self-sacrifice. Individuals were selfish—individuals stole from the common store—individuals thought in terms of personal promotion, or schemed for their personal safety. But in the mass, men did nothing of the kind. In no place did a man fulfill his duty to his neighbour, so well as on active service. There he shared freely with his fellows, and if he had a care, it was to see that he got less, and not more than his due. And the greater the hardship, the shorter the rations, the harder the life, the more intent he was to live according to his rule—to “play the game.”

It is for these three things, I fancy, that the best of the returned men stand. They will influence ex-soldiers everywhere, in dealing with the social problems which wait for us now war is over, “in that new world which is the old.” Nor need we suppose that they will affect the soldiers only: for there were vast numbers of men and women who belonged to neither of the services, but who dedicated themselves to war work of one kind and another, in exactly the same spirit as those who were enlisted. All the lessons of team work for a common object, supreme but quite impersonal, were open to workers in munition factories; and if they were never seared into them by the keenest experience of all, they will not altogether be forgotten.

Those who retain as dominant impressions of the war the three which I have sketched, are likely to bring a spirit into public affairs which is the reverse of Prussianism. We may suppose that they will organize into groups rather readily for objects common to the group: not expecting the state to nurse their enterprise, nor willingly letting the state interfere with it. And when other groups do likewise, they will be rather less ready to look for selfish motives, rather more ready to suppose that their motives are decent and generous, than if they

had never received their impressions or had lost them. There will be rather less rivalry, rather more of a spirit of partnership. We shall be more organized, and less centralized because of them.

Keen observers had already seen a movement in this direction before the war began. If there is anything in our analysis, it simply means that this movement will be strengthened. Our social fabric is honeycombed today with what are called class organizations. Every trade-union is open to this description, every manufacturers' association, every professional organization, each lodge of the united farmers. But the thing that matters most in all these bodies is not the form, but the spirit. The words "Sinn Fein," we are told, may be simply translated as "ourselves alone." If each group of persons with a common interest is to live in the spirit of those words, then we have indeed produced a dangerous series of class organizations. Their efforts will only weaken the structure of society, where they do not fail entirely through conflict with economic law. But an organized group is by no means inevitably swayed by selfishness; the medical profession is itself a group, organized loosely but organized for all that, with no selfish object before it, but only the performance of a public service.

The driving force behind these spontaneous groupings does not come always from the same direction. In broad contrast are the bodies organized by those who purchase goods or services, and the bodies organized by those who produce them for sale. To the former class belong all consumer's co-operative societies, and some producer's societies also: in the latter we find merchants' and manufacturers' associations and unions of workmen. Sometimes we come across a body which is both and neither; which exists in order to sell the produce of its members, and at the same time to buy for them the things they need. But in spite of hard cases of this kind, the distinction is fundamental and important, between group action to satisfy the wants of buyers, and group action on the part of those who sell.

Nowhere is it seen more clearly, than in the case of medicine itself. On the one hand, the whole of society depends on the work of the doctor. We are all of us consumers of his services; indeed, unlike the consumers of most things, we cannot do without him. To the world at

large, the medical profession stands in the rôle of producer: for doctors are producers of wealth no less (if no more) than manufacturers and farmers. The measure of their contribution to the common wealth, is the difference between the wealth which a people could produce without the medical profession, and the very much larger production which is actually made through their success in preventing, or treating human ailments.

The public has therefore an interest as real as that of the profession, in the practice of medicine today. It has usually sense enough at least to confess its own ignorance on matters purely technical. But if it knows nothing about disease, it may presume to have opinions no certain other things. The doctor himself is not concerned more directly with what we may call the economic aspect of medicine. For it is sometimes the misfortune of a community, that the more it needs adequate medical attendance, the less chance there is of ever getting it: and it is often the misfortune of an individual, that the more medical treatment he requires and gets, the less able he finds himself to pay for it. Chance spells of sickness have sometimes crippled families, and scattered the savings of a lifetime: and in other cases (doubtless far more common) the doctor has worked in the knowledge, that the greater his service to the patient, the less his prospect of ever being fully paid for it.

Now the public has learned in the last generation, that the risk of sickness is insurable. If it did not know this before 1911, it has learned a great deal since then. And if we cannot follow the custom (said to be practised in China) by which a man pays his doctor, so long as his health is good and he can earn a living (ceasing to pay as soon as he has to call in medical attendance)—if we cannot allow that excellent custom, then a system of payment for insurance may suggest itself as a convenience. In England, for instance, the National Insurance Act was imposed on the medical profession from outside. As the doctors themselves described the situation, it came like a wolf on the fold. It found them for the most part unprepared, and quite without alternative proposals. They did succeed in producing certain amendments; but under the circumstances, they could not but put up with the scheme.

Here is a classic instance in which the con

sumer took charge. He did this, and imposed his will on the producer, because the producer had done nothing effective for himself. In a world which is at present in most unstable equilibrium, which is being lifted this way and that by the pressure of contending forces, it offers a lesson, on which there is no need to dwell in this assembly. Probably the reaction against

a system of health insurance would be much the same here as in Britain. But it would be decisive, on one condition only. The producer could meet on equal terms with the consumer, if his plans already provided for the public health, with such completeness and economy that an arbitrary panel system offered *nothing*. Here indeed, group action vindicates itself.

CARCINOMA OF THE PROSTATE

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IT is my intention in this paper to take up particularly the clinical aspect of carcinoma of the prostate with special reference to its diagnosis.

FREQUENCY

The frequency of cancer in enlarged prostate varies from Young's figures of 21% down to those of the Institute of Anatomy in Munich which showed 2%. Most authorities' figures as to frequency are in the neighborhood of 15%. Thus we see that carcinoma of the prostate is not an uncommon disease.

PATHOLOGY

It begins as a small nodule in the posterior lobe, and from here it follows the planes of least resistance. Judd says in his paper before the Southern Surgical and Gynecological Association in 1914, "the malignant process always started in the posterior lobe, and was often distinctly separated from the rest of the gland which was not involved." He thus confirms the discovery of Young and Geraghty that the carcinoma originates in the posterior lobe but may spread to other parts of the prostate. It may infiltrate upward into the region of the seminal vesicles leaving the prostate at the entrance of the ejaculatory ducts with the trigone anterior and the fascia of Denonvillier posterior. The seminal vesicles do not become infiltrated but cancer cells may gain access to the lumina of the vesicles and ejaculatory ducts. The musculature of the trigone and bladder

together with the peritoneum may be involved. The rectum is rarely, if ever, involved owing to the protection given by the two layers of the fascia of Denonvillier. The carcinomatous infiltration may also go distal to the prostate and involve the membranous urethra.

Glandular metastases are found clinically in 20% of cases, these being in the inguinal, iliac, cervical and retroperitoneal glands. In the post-mortem room, Pasteau reports glandular involvement in 85% of 71 cases. Bony metastases are found to go to most of the bones of the body. Blumer in his series names, in order of frequency, the vertebrae, ribs, pelvis, femur, skull, sternum and humerus.

Hypertrophy is associated with cancer in 61% (Young) of cases. This is important from a diagnostic standpoint as we will see later.

SYMPTOMS

The early symptoms are the important ones in most diseases and those which make us suspect some pathological process. So it is with any urinary disease and especially with carcinoma of the prostate. Thompson Walker gives as the earliest symptom in his series, difficult micturition. There is a delay in the starting of the stream, small force and dribbling at the end of urination. Young gives frequency as his earliest symptom. The patient rises to urinate first once each night and gradually increases until he may be getting up several times. There may also be day frequency, and gradually, the patient may find greater and greater difficulty in

emptying his bladder until the day comes when he cannot start the stream-----retention.

As the growth involves its musculature the sphincter becomes rigid, control of urination is difficult and we get dribbling continuously. Pain is sometimes the initial symptom. It may be unconnected with micturition or the flow of urine, dull in character and persisting over months or even years. It is situated in many and various places such as the penis, rectum, sacrum, hip-joint, perineum, thighs, testicles, urethra, anus, sacro-iliac synchondrosis, suprapubic region, groin, legs, shoulder joints. Sciatica may be the constant symptom.

Haematuria is more a symptom of prostatic hypertrophy than of carcinoma. Haematuria is rarely present in an early case and is seldom found in cases which are solely carcinoma and not mixed with hypertrophy. As the growth infiltrates and narrows the urethra the size and force of the stream will become smaller and smaller until acute retention is present.

PHYSICAL EXAMINATIONS

A patient consulting a physician or surgeon complaining of any urinary symptom should have a complete examination of that system to determine the cause of his trouble. In men over 50 years of age, one should suspect prostatic disease in one form or another the minute they have a regular frequency of once each night or any of the cardinal urinary symptoms. This should lead to an examination of the urinary system. Have the patient stripped and palpate the region of both kidneys, both flanks, suprapubic region, both inguinal regions, hernial rings, penis noting any abnormality of the foreskin, glans, meatus, urethra and corpora cavernosa. The urethra can be palpated back to the perineum and later when a rectal examination is made the remainder can be felt and abnormalities noted. Both testes, epididymes, vasa deferentia should also be palpated. The patient is then asked to void urine into three sedimentation glasses and the characteristics of each glass is noted. If the third glass is cloudy, (the urine from the bladder) the cloud must be due to urinary salts, pus or blood. The usual tests are applied to determine which of these is making the urine cloudy. Then one comes to the rectal examination, a procedure which is very important from our standpoint.

RECTAL EXAMINATION

Note the presence or absence of haemorrhoids, the tone of the sphincter, the membranous urethra and regions of Cowper's glands. As the finger follows up the membranous urethra it comes to the tip of the prostate. Take a general survey of the prostate to ascertain its size, then note the median furrow, swing over to the right lobe and note any areas of induration, their size, shape and consistence, or adhesions to the lateral pelvic walls. Next examine the left lobe in the same way. Then pass the finger up to upper border of the prostate and very gently swing the finger to each side and note the seminal vesicles. If there is any induration in the vasa deferentia they can be palpated more to the median line than the vesicles.

With a series of symptoms which point to some pathological change in the prostate, we cannot make a definite diagnosis without the physical examination, the most important part of which is the rectal examination. In fact, with one exception, the only definite means of diagnosing carcinoma of the prostate is by rectal examination.

In further examining the prostate one must note the consistence, contour of the surface, size of the prostate and any invasion of the surrounding structures. The consistence of a carcinomatous nodule is cartilaginous or almost stony hard. There may be some resilience beneath this stony hard area but one must bear in mind the possibility of some adenomatous hypertrophy beneath the nodule. Several of these nodules may be present and may coalesce giving a slight indentation in the surface and thus a nodular contour. If the area above the prostate between the vesicles and the trigone is involved, one gets the hard area extending up on one or both sides like horns or wings from the upper border of the prostate. There may also be an infiltration and hardening of the area between the vesicles giving an area of induration called the intervesicular plateau. In the mass felt by rectum it may be impossible to distinguish the outlines of the prostate. There may be adhesions to both sides of the pelvis showing a very firm fixed mass. The membranous urethra may be infiltrated also showing it as very firm, hard and inelastic. A very important sign of carcinoma of the prostate is that brought out by Dr. Geraghty of Baltimore.

With the finger in the rectum and the cystoscope in the urethra (or any other metal instrument) the whole of the membranous urethra, prostate and intervesicular space is palpated and any nodules or areas of induration between the instrument and the fingers noted. The beak of the cystoscope can be turned toward the finger and the infiltration beneath the trigone felt. This is a very important sign in the early diagnosis when there is no extension of the carcinoma from the prostate and a small nodule is present in the posterior lobe. This nodule can be definitely located between the cystoscope and the finger, its consistence noted and a diagnosis made.

Very often there is great difficulty in passing a cystoscope or a sound in these cases. It is a sign of closing of the posterior urethra by the carcinomatous infiltration around it. The cystoscopic picture may show some adenomatous lobes encroaching on the internal meatus, but as the carcinoma rarely involves the bladder mucosa it is not of much help in diagnosis.

Another type of carcinoma is the round, smooth, hard prostate. This is small and does not show localized areas of hardness but gives one the first impression of a small hypertrophied prostate though there is not the elasticity on pressure that one gets in the adenoma but rather the hard cartilaginous consistence of the carcinoma. This will also involve the region of the vesicles by a similar hard smooth area continuous with the prostate. This type offers the graver prognosis as metastases occur earlier.

DIFFERENTIAL DIAGNOSIS

One is sometimes called upon to make a differential diagnosis between adenoma, tuberculosis, chronic inflammation and carcinoma. The adenoma is firm, hard, elastic with a smooth contour and no involvement of the vesicles. The chronic inflammatory prostate may be

large and boggy but is usually indurated in small areas with induration and slight hardness in the vesicles. Adhesions to the lateral pelvic walls are also present. The prostatic secretion will show many pus cells. It is sometimes a very difficult problem to differentiate carcinoma from chronic inflammation but after going into the history and a thorough examination, a diagnosis can be made. A tuberculous prostate is often accompanied by a tuberculous epididymitis. If not, the induration which extends to the vesicles and vasa deferentia is smooth, not very hard but of a degree between that of the chronic inflammatory and the carcinoma.

TREATMENT

The operative procedure depends entirely on whether the carcinomatous process is confined to the prostate or not. Unfortunately, we see very few early cases of carcinoma of the prostate. If it is confined to the prostate, one may do Young's radical prostatectomy. If it has extended beyond the prostate, one is dependent entirely on the patient's symptoms as to procedure. There is usually a stricture of the prostatic urethra and acute retention. One can make a permanent suprapubic opening or do a perineal operation in which the whole of the prostate urethra is gouged out with a bone curette and greatly enlarged with removal of a large amount of prostatic tissue.

RADIUM

Radium has been used a good deal for carcinoma of the prostate. It is used in large ampules, as small tubes containing the radium emanations and needles which are inserted into the substance. In no case has there been a definite cure but there are a great many instances of marked decrease in the size of the growth and alleviation of the symptoms.

Case Reports

OBITER SCRIPTA

*Being Abstracts from Case Reports in the
Medical Clinic of the Royal
Victoria Hospital*

C. F. MARTIN, M.D.

Case 1.—*Multiple Arthritis treated by medical drainage of the gallbladder owing to the discovery of an infected gallbladder in the course of routine examination for an infected focus. Cure almost complete within a few weeks.*

A. E., age 28, was admitted to the Hospital in December, 1921, complaining of painful swelling of the joints of the feet, and fixation of the jaw. His illness had started in the previous July when stiffness in the left maxillary joint appeared, causing considerable pain. Within a short time the movements of the jaw were much restricted, impeding both speech and swallowing power. From this he gradually recovered until November, when there was a recurrence of stiffness in the jaw, and pain in the right ankle commenced. From that time on, up to the date of his admission, there had been more or less trouble both with the joints of his feet and more or less fixation of the jaw. No other joints were affected.

A careful examination revealed no abnormalities in any of the viscera, nor could any of the ordinary avenues of infection be found to reveal signs of disease:—The teeth and accessory sinuses were normal to all the usual methods of examination; the genito-urinary system was found to be normal, while in the intestinal flora there was no evidence of a focus of disease. The blood content of uric acid was 1.96 grs. per 100 c. c. of blood, a normal finding. In the absence, then, of any evidence of focal infection, drainage of the gallbladder was carried out by means of the Rehfuß tube and showed definite evidences of infection of the biliary tract. Examination of the fluid by Dr. Henderson showed the specimen to contain many evidences of inflammation in the cellular content, and cultures revealed the presence of *B. Coli Communis* (A. Indolic). Medical drainage of the gallbladder was carried out, the joints yielding rapidly to the treatment within the first fortnight; the maxillary joints became

free from evidences of disease, and the ankle joints subsided shortly afterwards.

The patient left the hospital on January 28th, 1922, almost entirely well, carrying with him an autogenous vaccine and tube to carry out his own medical drainage from time to time.

Note.—This experience has been repeated in other cases—where however a definite history of gallbladder infection was elicited.

Case 2.—*Remarkable Case of Post-operative Intussusception of the Small Intestine, with Spontaneous Discharge of the Intussusceptum—27 inches long. Immediate Relief of Symptoms. Patient discharged from Hospital feeling well.*

Mrs. M. M., 26 years of age, was admitted to the Hospital in March, 1922, complaining of abdominal pain, nausea and vomiting.

Since childhood she had had recurrent attacks of chronic appendicitis, the appendix being ultimately removed in 1919; at the same time, a small ovarian cyst, the size of an egg, was found and excised.

In April, 1921, during her third pregnancy, she suffered a severe injury to the abdomen, caused by a barrel falling upon her. This was immediately followed by severe pain, nausea and vomiting, and after five days the abdomen presented signs suggesting the need of an immediate operation. The surgeon in charge at the time, in her home town, exposed the abdomen, and rectified what he regarded as a diverticulum partially invaginated, lying behind the uterus. Labour occurred at the normal time, and a living child was delivered.

In November, 1921, the third operation was performed, and a number of stones were removed from the gallbladder. No obstruction was found, but the cæcum, which was noted to be exceedingly movable, was plicated back into position, and after a stormy post-operative course, she was discharged from her hospital in good condition.

On admission to the Royal Victoria Hospital in March, 1922, she was again suffering from severe epigastric pain. She stated that for some weeks past she had suffered from nausea and vomiting, for which her physician was obliged

to give her morphia at frequent intervals. The abdomen itself, while somewhat distended, was not rigid either locally or in general, but on palpation there was a sense of cushion-like fulness in the lower right iliac region and hypogastrium. The temperature varied in the neighbourhood of 100° ; the pulse was 100, and the respirations 22.

A barium meal given a few days later showed the stomach to be normal in its motor function. The colon, however, was filled with barium and gas, the opaque fluid showing itself in tiers, terraced, as it were, one loop above the other centrally in the abdomen. The course of the colon seemed tortuous and the muscle atonic. Evacuation, however, was but slightly delayed.

The constipation of the first ten days was followed by diarrhoea for one week, there being nothing specially abnormal in the stools. A pelvic examination showed no sign locally of the etiological factor, and on March 17th, she was given an ounce of castor oil, and three hours later passed 2 ft. of mottled, blackish-grey, necrotic small intestine, the whole lumen of which was almost intact. The mesenteric border of the specimen was quite distinct. At one end a definite lumen was present, 2 ins. in diameter, becoming suddenly narrowed for 9 ins., followed by a pouch like dilatation, which contained a solid, oval, greenish mass of faeces 3 cm. long and 1.5 cm. in diameter. Beyond this pouch, which was 3 ins. long, the gut was again contracted to 1 in. in diameter for 3 ins.; again a pouch-like dilatation followed upon this, but was empty at the extreme end of the specimen, the lumen becoming more solid, necrotic fusion having apparently occurred. Microscopic examination of the specimen showed all three layers of the small intestine definitely enough to be recognized, though, naturally, the mucosa was necrotic throughout. (Report by Prof. Oertel.)

Three days later the patient's relief seemed to be complete, and she insisted upon leaving the hospital, feeling, as she thought, again in complete health. Unfortunately, this rendered a further examination by the barium meal impossible.

The subsequent history however, furnished by her physician reveals the fact that the marked improvement was rather short lived. There has been a return of the pains and vomiting, necessitating the use of sedatives. Further information is unavailable for the present.

Case 3.—From Dr. A. T. Henderson.—*Gastrectasis from Spastic Pyloric Stenosis due to Duodenal Ulcer. Visible Peristalsis for Two Years without special digestive symptoms or discomfort. Gastro-enterostomy after two years. Complete Cure.*

The patient was a man 60 years of age, who—in December 1919—consulted his physician for a slight attack of diarrhoea and some mild gastric discomfort, followed by vomiting on one occasion only. There were noticed in the vomitus the skins of some fruit taken 48 hours previously, and believing that the man had some dilatation of the stomach, he was sent into hospital.

On admission it was found that all his organs, with the exception of his stomach, were normal. On examining the abdomen, however, one saw distinct evidence of peristalsis, and both the barium meal and the gastric analysis showed evidence of a very definite benign stenosis of the pylorus. The acidity was abnormally high and the gastric delay nearly 40 hours. At that time operation was suggested, with a view to performing gastro-enterostomy, but as the patient declined this form of treatment, nothing was done, and he was discharged, feeling—according to his own statement—"as well as he ever did." From this on to the present time, *i. e.* for two years, he has suffered practically no inconvenience except an occasional slight indigestion; there was never any vomiting and only a very slight loss of flesh; the bowels moved daily without much aid, and the patient travelled about the country and carried on his routine as though he were in perfect health.

On December 12th, 1921, after a few days of indigestion, with flatulence and some regurgitation of food, he was seen again and admitted to hospital for the second time. On this occasion even greater gastric distention was found and the same marked visible peristalsis; there was some resistance in the right upper quadrant, but no mass was felt. Fractional analysis showed a very marked retention in the early morning, with total acidity of 70 and a free hydrochloric acidity of 45, the gastric curves remaining high after two hours. Microscopic examination showed occult blood, abundant sarcinae and a few yeast cells. The barium meal showed gastric retention after 70 hours.

After a period of observation, during which he suffered no special discomfort, he was referred for operation. At the operation the pylorus itself was found quite free, but a definite chronic

ulcer of the duodenum was present—about 1½ inches beyond the pyloric opening but so small as to cause no diminution of the lumen. A gastro-enterostomy was performed, and the patient made a good recovery and has been steadily gaining in weight ever since.

Note.—This case is of special interest as illustrating the degree to which gastrectasis may occur without causing any special discomfort for years. Undoubtedly the visible peristalsis was due to spasm and not to any organic narrowing of the orifice, for the duodenum itself was quite patent, in spite of the scarring ulcer.

A NOTE ON THE INCUBATION PERIOD OF ENCEPHALITIS LETHARGICA. REPORT OF A CASE DEVELOPING WITHIN FIVE DAYS OF EXPOSURE

FORBES GODFREY, M.D., *Mimico*,
AND
N. B. GWYN, M.D., *Toronto*

Miss S., nurse, came early in December complaining of double vision, fever and weakness, she had been nursing a case of encephalitis in Mimico. After five days on the case she was taken with fever, headache, malaise, and weakness, then with persistent vomiting. Three days later she came to hospital and en route noted the diplopia. This was, however, only temporary and all symptoms seemed to clear quickly; she went out after a week, but the double vision came on again very acutely giving her vertigo, and when seen, her eye was still black from a collision due to the distorted vision. There was difficulty in writing for a time. She again improved quickly, and on examination later there was only to be seen a droop of the left eyelid, plus a weak left internal rectus. She complained of dim vision. No abnormalities of reflexes, no further motor or sensory disturbances could be made out. On December 30th, she complained of sleeplessness and anxieties; the vision had cleared, she was however, much depressed. Lumbar puncture at different times gave a large amount of fluid under pressure, with distinct turbidity, a few red cells, and a positive globulin. Blood and fluid both gave negative Wassermann. By February 1st, 1922, she had cleared slowly, though she had had recurring headaches and sciatic pain

for three or four weeks, there had been no more fever. About this date there was a sudden relapse,—severe headache, vomiting, pain in right leg, pain and tingling in both arms; there was a distinct weakness of right eyelid and right internal rectus, but the nerve heads did not look more than slightly congested; there was some double vision. Temperature 101°. From this time on patient showed marked weakness and took many weeks to regain her strength, making eventually, however, a complete recovery. The eye condition, the headache and sciatic pain have completely gone.

This case is of the greatest importance in considering the period of incubation of encephalitis; there are few opportunities of determining accurately this period of the disease; of further interest was the first report of Dr. McCallum on the eye condition. The headache, vomiting, and early stage of optic neuritis were severe enough to suggest to him an acute cerebritis, or a brain tumour. The subsequent course of the disease with its relapses, negative Wassermanns, recurrence of eye signs and eventual cure, would seem to leave no doubt as to the nature of the case. We were fortunate in having Dr. Goldwin Howland's confirmation of our ideas.

The case on which this nurse had been in attendance seemed to have been a very severe case of encephalitis. Doubt existed for the first day or two on account of the patient's early history. She had had signs and suspicions of kidney damage with high tension for some time. In addition to this she had been taking veronal, and had been in the habit of taking alcohol from time to time. Three days previous to the time of the writers' seeing her, she had begun to feel unsteady on her legs, and a little later was seeing double, by night time she was unconscious, there was stertor, and the urine showed distinct trace of albumin. At the end of three days she was still unconscious with a droop of the left eye, weakness of the right internal rectus, and congested discs, she was quite incontinent, and both legs were in a condition of absolute flaccidity with absent reflexes. There was nothing more to be made out in the eye grounds. Systolic blood pressure was 170. m. m. There was fever 103°, and an acute dry pleurisy on the right side. Three days later she seemed much better, the legs could be moved normally, the reflexes were active, there was no Babinski, she was conscious, was able to control her bladder, there was still some droop of the left eyelid, and the fever had disap-

peared. From that time she improved quickly, although there still remained a sluggishness of the intellect, and at times an inability to appreciate the nature and use of objects. After three weeks she began to show lethargy and weakness, with incontinence of urine and feces, fever reappeared, as did the droop of the left eyelid, and there was complete inability to protrude tongue; she seemed quite unable to speak, pupils were equal and reacted well, there was weakness of the right arm, the legs were now somewhat stiff, there was no Kernig's sign and no rigidity of the neck; reflexes were all increased in the limbs, but the abdominal reflexes were completely absent. Patient remained in this condition for three or four weeks, seeming quite unable to speak or to understand. Improvement then set in, and pa-

tient is now apparently quite well, though it is still to be noted that at times she will be easily bewildered for a few seconds, and unable to appreciate the proper nature and use of certain objects. Wassermann of both blood and spinal fluid was negative. Spinal fluid was under pressure, was clear and filled two large test tubes, there were sixty cells per c. c. m. largely polymorphonuclear, the urine had cleared completely, the incontinence of urine and feces disappeared, and the paraplegic symptoms have disappeared. This case is of particular interest on account of the antecedent history. The relapse, the fever and signs of infection, with the multiform involvement of the nervous system make a very complete picture of encephalitis, hardly needing the infection of the nurse for its confirmation.

Retrospect

THE ETIOLOGY OF CANCER

WM. BOYD, M.D.

The essential cause of malignant disease is still completely unknown. The importance of certain predisposing etiological factors, such, for instance, as irritation, is fully recognized, but the veil covering the mystery of the exciting factor which leads to the unlimited cellular proliferation has not yet been rent in twain.

The idea that the unknown stimulus may be due to the action of some hitherto undiscovered microorganism has of late hardly received the attention it merits. When the data recently presented by Emery and other writers is summarised, the result is a mass of evidence which deserves serious consideration.

The microorganism must be so small as to escape detection, but this is true of many of the filter-passers. It must inhabit the cell, and multiply within it, so that when the cell divides each of the daughter cells is also infected. It must produce a toxin with the power to induce cell division.

If each cell contained only one microbe it would be difficult to conceive how both should subdivide at the same moment. But there is no reason why there should be only one. The

pus cells in gonorrhœa, the specific cells in rhinoscleroma, are loaded with bacteria. In tropical sore a single cell may contain from 100 to 200 organisms.

The production of cellular proliferation by bacterial toxins may be observed in any case of chronic inflammation. The formation of giant cells in tuberculosis affords a familiar example of this process. Scharlach R when applied to an epithelial surface causes a continuous proliferation of epithelial cells which may bear a strong resemblance to the proliferation seen in an epithelioma. Even more striking than the action of Scharlach R on epithelium is the recent experimental production of carcinoma by the application or the injection of tar. Granted a bacterium which has a continuous stimulating influence on epithelium like Scharlach R, and provided it can live and multiply in a cell, the result will be a neoplasm.

Many conditions now known to be infectious in nature can with difficulty, if at all, be distinguished from true neoplasms. Warts are known to be due to an infection, they can be inoculated from one person to another, and yet they are identical both macroscopically and microscopically with a papilloma. Molluscum contagiosum is due to an unknown filter-passing organism, but it bears the closest resemblance to an innocent epithelial tumour. Coccidiosis of the liver of

the rabbit produces an appearance identical with that of a complex papilloma such as a papillary tumour of the bladder, so that if the cause was not known to be a protozoon the condition would be regarded as a true neoplasm. The infective (venereal) sarcoma of dogs is histologically a true tumour, a round-celled sarcoma, but it is certainly infectious in nature. Rous' chicken sarcoma probably belongs to the same category. Vegetable galls, which are organised structures rather than mere masses of hypertrophied tissue, are due to the action of a toxin injected by an insect when the embryo is deposited. Indeed all the principal features of true tumours can be paralleled by plant conditions which are known to be due to parasites. The researches of Erwin Smith have shown that when the proper species of plant is inoculated with *Bacterium tumefaciens* of crown gall, a growth will result which bears a strong resemblance to mammalian cancer. Moreover, the secondary growths which develop are not produced from the tissues where they are found, but from that of the primary tumour. A secondary growth on a leaf is composed of root cells if the primary growth arises in the root, or of stem cells if the growth begins on the stem.

The common sites of tumour growth appear to point to a possible bacterial cause. The parts of the body liable to infection are the common sites of primary tumours. The mouth, the stomach, the rectum, the uterus, the breast, all in free communication with the exterior, are the most frequent sites of carcinoma. The small intestine, the urinary bladder, and the gall bladder, in which the communication is less free, are less commonly affected. The relation between gall stones and carcinoma, and between gall stones and infection, is well recognised. Such organs as the spleen, the liver, the brain and spinal cord, the heart, and the muscles, all more or less isolated from the exterior, are rarely the seat of primary growths. Yet the liver possesses no natural immunity, for it is one of the organs most frequently affected by secondary growths. It is curious to recall that tumours of ciliated epithelium (nose, bronchi, Fallopian tube, vas deferens), are extremely rare, whilst tumours of all other kinds of epithelium are equally common. May it be that these ciliated cells are better able to protect themselves from invasion?

Ochsner has recently called attention to some racial characteristics which are of interest. Cancer of the stomach is very common in what he calls manure-eating peoples. It is common, for instance, amongst the Japanese who eat raw vegetables grown in soil fertilised with human or animal manure. It is remarkably rare in India, where their religion makes the people boil their food and drink. On the other hand the Japanese, who are scrupulously clean and wash in hot water, are singularly free from cancer of the skin, a condition which is very common in India where the skin is frequently very dirty. Cancer of the stomach is very rare in the tropics, except where vegetable gardens are conducted by the Japanese and Chinese. In the tropics human excrement is not needed to fertilize the soil. Gastric cancer is common in manure-eating animals, such as fowls and pigs. Marine and Gaylord have shown that fish living in ponds infected with faeces develop cancer of the gills, whereas control fish in pure water do not.

It may be urged that if tumours are infectious in nature, they may be transmitted from one patient to another. But a slight knowledge of the history of medicine will show that there may be nothing so difficult as to prove the communicability of a disease. As late as 1891 one of the standard text-books of medicine stated in the most categorical manner that phthisis could not possibly be an infectious disease. What case is known of a carbuncle being communicated from one person to another, and yet it is certainly bacterial in origin? Moreover, the possibility of cage infection in laboratory animals appears to be definitely proved. Cages which have been inhabited by cancerous mice show an undue proportion of positive cases. Loeb has recorded three cases of cystic sarcoma of the thyroid developing in rats in adjacent cages, an occurrence all the more extraordinary when it is recalled that spontaneous tumours in rats are very rare, and that this variety of tumour is even rarer.

The evidence in favour of the bacterial causation of tumours is in no way overwhelming. There are many grave difficulties which could readily be urged. It is merely intended to point out that there is more to be said for this view than is usually admitted in text-books of pathology, and that the only wise course is to maintain an open mind.

Editorial

PANCREATIC EXTRACT AND DIABETES

THE treatment of diabetes consists in a reduction of the amount of carbohydrates and, if necessary, of protein in the diet to such a degree that the percentage of sugar in the blood returns to the normal level. When this is accomplished the functions of the body which control the metabolism of carbohydrates are relieved of the overstrain under which they have become progressively more and more weakened as the disease progresses. The rest afforded these functions by reduction of the diet allows them to recuperate, so that after some time it is not infrequently the case that some carbohydrates can again be tolerated without producing any of the symptoms of the disease. It is usually considered that some structure in the pancreas (the Isles of Langerhans) forms the organ which controls these functions, and that it accomplishes its work by means of an internal secretion. Final proof of this hypothesis has, however, been lacking, for although experimental diabetes of an extremely acute type inevitably follows complete removal of the pancreas in laboratory animals, and diabetes mellitus in man is frequently found to be associated with pathological changes in this gland, it has until recently been impossible to show that administration of an extract of pancreas has any constant and significant effect in reducing the disturbed sugar metabolism or in ameliorating any of the other symptoms of diabetes.

At intervals since 1887, when Minkowski discovered that excision of the pancreas in dogs causes diabetes, attempts have been made by numerous investigators to supply the evidence of an internal secretion. Some of these attempts have been crowned by a certain amount of success; notably, among recent in-

vestigators, those made by Knowlton and Starling, Kleiner, Murlin, E. L. Scott, and Paulesco; but so far as can be ascertained, the results have been considered, often by the authors themselves, to be insufficiently constant and significant to justify more intensive research with the object of securing preparations of greater potency that could be used for the treatment of diabetes in man.

In a paper appearing in the previous number of this Journal are given the results of a remarkable series of observations emanating from the physiological and pathochemical laboratories and the medical clinic of the University of Toronto, by F. C. Banting, C. H. Best, J. B. Collip, W. R. Campbell and A. A. Fletcher, in which it is shown that an extract of pancreas can be prepared capable of removing all the cardinal symptoms of diabetes both in animals and man. Thus, it caused the blood sugar to return to the normal level, the sugar of the urine to disappear, acetonuria to vanish and the respiratory quotient to rise towards its usual level. Not alone were the objective symptoms relieved, but the well-being of the patients definitely improved. The extract was administered subcutaneously. These clinical observations would not have been warranted had Banting and Best not previously shown by experiments on diabetic (depancreated) dogs conducted in the laboratory of the writer, that in one animal at least, by daily injections of extract, life could be prolonged far beyond the time during which untreated diabetic animals usually live.

Many other corroborative results of the remarkable potency of pancreatic extracts have been gathered, and great attention is being given to the best method

of their preparation in bulk. It has been thought advisable not to publish these methods in detail until they have been thoroughly worked out and the proper dosage determined; for it has been found not only that toxic symptoms may follow the administration of improperly prepared extracts, but that the antidiabetic effect is readily lost by apparently trivial deviations from the prescribed method. This large scale preparation of the extract is being done in the department of physiology by the aid of funds granted by the Connaught Laboratories of the University of Toronto.

As is frequently the case on passing from small to large scale production great difficulties were encountered, so much so, indeed, that for over two months it was impossible to obtain extracts of anything like the potency of those used in the above referred to observations on diabetic patients. There is reason to believe, however, that these difficulties will soon be overcome and that details of the method of preparation of the extract can be published in detail. Meanwhile a sufficient amount of extract has been available to continue with the laboratory observations and many significant results have been obtained. These are important not only because of their scientific interest but also because they indicate the clinical possibilities of the extract.

The large amount of information collected has been the result of excellent team work by a group of workers including besides those already mentioned, J. Hepburn, H. K. Latchford, E. C. Noble and the writer. Briefly, the most significant of the results which have been obtained are as follows: Subcutaneous injection of the extract into normal rabbits causes the percentage of sugar in the blood to fall, and when this reaches a certain level (about 0.045 percent.), perfectly characteristic symptoms of a convulsive character appear and, if left alone, the animal passes into a comatose condition, which soon ends in death. If a solution of sugar be injected subcutaneously when the symptoms appear, the animal immediately recovers and

may remain perfectly normal or pass again into the convulsions which may be removed a second time by injections of sugar. Many observations have convinced us that these symptoms are definitely related to the lowering of blood sugar—they may indeed be called hypoglycæmic convulsions—and this is all the more interesting in light of the work of F. C. Mann who found similar symptoms to develop in dogs when the blood sugar was lowered to about 0.04 percent by isolation of the liver from the circulation. The discovery of this effect on normal rabbits has proved a most important one in connection with the isolation and purification of the extract, since it affords a readily available laboratory test object. It obviates the necessity of using depancreated dogs for testing the potency of the extract and therefore has greatly facilitated our work. As is to be expected an extract which acts only feebly on normal rabbits has a much more pronounced effect on the hyperglycæmia of diabetic dogs.

Not only is the blood sugar lowered in rabbits that are normal but also in those rendered diabetic by any of the experimental methods usually employed to bring this about. These are puncture of the floor of the fourth ventricle (Piqure), asphyxia, poisoning by carbon monoxide gas, ether, or adrenalin. None of these causes hyperglycæmia in rabbits after injecting them with sufficient amounts of pancreatic extract. There may occasionally be a slight increase in the percentage of blood sugar but never to anything like the extent usually observed without extract. The animals used for these experiments were always well-fed with carbohydrates and the glycogen content of the liver determined. The importance of this result is that it shows us that even the purely experimental forms of diabetes have much in common with the clinical forms.

Determination of the percentage of glycogen and of fatty acid in the liver, heart and blood of diabetic animals either injected or not injected with extract has revealed the fact that extract entirely alters the distribution and amount of

these substances. Thus, the liver of a pancreatic diabetic dog never contains more than a very small amount of glycogen even when the animal has been ingesting large amounts of carbohydrate; on the other hand this organ under these conditions is heavily loaded with fat. When extract is given, however, a very large amount of glycogen (over 12 per cent.) appears in the liver and the amount of fat coincidentally declines. At a certain stage in the treatment, of course, considerable amounts of both fat and glycogen may be present side by side. The blood of untreated diabetic dogs (depancreated) contains about two per cent. of fatty acid indicating a marked lipæmia, but if extract is given this disappears down to about 0.5 per cent. The heart of untreated diabetic animals contains the highest percentage of glycogen of any organ in the body but this becomes markedly lowered after treatment with extract.

²⁾ The importance of these observations rests on the fact that they show that the function which is primarily regulated or controlled by the internal secretion of the pancreas is that concerned with the deposition of glycogen. They would seem to suggest that glycogen must be an essential preliminary stage in the utilization of sugar by the animal body and that when the pancreatic hormone is absent excess of sugar leads to the mobilization of large quantities of fat.

The various effects which are described above all indicate a profound influence of some constituent of the pancreas on the earlier stages of carbohydrate metabolism, namely, the glycogenic function and the blood sugar level, but it might well be that these could be affected with-

out there being any change in the ultimate utilization of sugar by the tissues. This latter process is after all the most important one and its partial or complete failure is the most striking symptom of diabetes. The extent of this combustion of sugar in the body is gauged by determining the respiratory quotient which is done by analysis of the expired air to find out how much carbon dioxide is being given out and how much oxygen is being absorbed by the body. This should always be done by reliable apparatus and by trained observers. In a normal person or laboratory animal fed on carbohydrates the quotient (R. Q.) rises nearly to 1.0 but in a diabetic patient or animal it fails to do so and may be as low as 0.65 its height varying with the severity of the disease. When pancreatic extract is administered along with carbohydrates in diabetes, on the other hand, the quotient rises as in a normal person clearly indicating that utilization of carbohydrate in the tissues has been restored.

In the light of these various types of evidence we feel justified in expressing the belief that it will be possible by administration of pancreatic extract, to treat diabetes in man much more satisfactorily than has hitherto been the case. Dietetic control must no doubt still remain an important feature of treatment, and will probably be all that is necessary in the earlier stages of the disease but in the later stages and in the various crises that are otherwise unmanageable it is hoped that administration of extract will prove of value. What other therapeutic uses the pancreatic extract may have remains as yet undetermined.

J. J. R. MACLEOD

TREATMENT OF DIABETES MELLITUS BY PANCREATIC EXTRACTS

WITH the recent communication from the Toronto School in the March number of this Journal, upon the treatment of diabetes mellitus, one naturally wonders whether a new era in medical history has been opened. We feel that

they are working along the correct and rational lines for the ultimate solution of the problem, but from published data such has not been reached as yet.

It would appear that a potent extract with low toxicity of the internal secre-

tion of the pancreas has been prepared, and that this extract can be safely used by subcutaneous injection in the human being. Further their results show that it has a marked but temporary lowering effect upon the percentage concentration of the blood sugar with a resultant decrease in glycosuria and an improvement in the degree of acidosis. Its effect upon the respiratory quotient shows that it actually increases the amount of carbohydrate oxidised in the body.

All of this work is very encouraging and the whole medical profession awaits its perfection. For a method of treat-

ment to be satisfactory first it must be safe, necessitating in this instance the uniform preparation of a non-toxic extract. Secondly, a treatment which would necessitate frequent subcutaneous injections is always handicapped at the outset. Nevertheless, let us hope that the group of Toronto men will be able to overcome these difficulties and provide the profession with means of effectively treating this widely distributed disease, which for many years has been the subject of intensive study by chemists and pathologists.

THE AFTERMATH OF ENCEPHALITIS LETHARGICA.

WHETHER we accept the view that Encephalitis Lethargica is a new disease, or adhere to the belief that its present widespread incidence is merely the periodic manifestation of an old but hitherto unrecognized disease process, we must acknowledge that no disease of the central nervous system since its first description by Economo, has commanded the scientific attention of the medical world to a similar extent.

While the acute infection has been, in itself, of outstanding interest, attacking the cerebro-spinal axis wheresoever it would, and with an apparent disregard for structure, though frequently manifesting a preference for the midbrain and pons, this stage of the infection by no means absorbs our entire interest.

While it appears that the incidence of the acute stage is at present on the wane and, while there is always the danger of overworking a new conception of disease in our quest for the cause, any large neurological clinic of to-day presents ample evidence of the passing of the serpent. This evidence is afforded by the number of clean cut sequelæ which are encountered months after the acute stage has subsided which point to the unobserved or unrecognized significance of a past fever or grippal attack.

Were it possible to re-examine all the

cases that have passed under this diagnosis in the past three years, the writer is convinced that the early optimism with which the diagnosis of encephalitis lethargica was regarded, would receive a severe shock. True, many cases have recovered and many have passed from our observation well on the way to recovery, but the frequency with which we encounter psychic or structural defects, that can be rationally attributed only to a former attack of encephalitis is daily becoming more striking and more alarming.

Among the various and complex types of sequelæ that follow in the trail of the acute infection, the so-called paralysis agitans syndrome stands out as the most important. The simple complaint of weakness of the legs with an instability of station, or the appearance of a slight tremor occurring some months after an attack of fever with or without its concomitant lethargy, is only too ominous an indication of a progressive pathological lesion, and the rapid development into the classical Parkinsonian complex of symptoms only too readily confirms one's suspicion. This complete syndrome is so identical, clinically, with that of the true Parkinson's disease that a differential diagnosis is, sometimes difficult. However, with the history, the

age incidence, the suddenness of onset, the absence of the slow hemiplegic progression from limb to limb, so typical of paralysis agitans and, particularly, with the signs of a more extensive involvement of the brain structure than the basal ganglia, the greater number of cases, manifesting a pathological lesion in the corpus striatum, can be properly classified. In almost all cases, in which the basal ganglia are the chief seat of the disease, it should not be difficult to recognize the classical features of the Parkinsonian pictures. The muscle rigidity, generally more marked in the back and neck muscles, the loss of associated movement and poverty of voluntary movement, the typical attitude and facies and the varied types of tremor leave few signs that are peculiar to the real disease. Yet, rarely do we find the syndrome uncomplicated by the signs of a more wide-spread involvement. Probably, the one most commonly met with is an implication of the pyramidal system, which may be unilateral but more frequently is bilateral; of the cranial nerves, the third and seventh have been observed most frequently to be the seat of signs of residual involvement.

In one case, that of a young girl, the picture was indistinguishable from that of true Parkinson's disease but, as evidence of further involvement of the brain axis, she had developed a spasmodic tic-like deviation of the mandible to the right. Though the history of a previous infection was lacking in this case, the age of the patient and the associated involvement of the trigeminal nerve served to classify the case as one of encephalitis.

Next in frequency, if not in interest, are the various psychic disorders that appear to have their origin in an acute attack, though separated from the period of convalescence by a considerable lapse of apparently perfect health. Archambault has attempted to formulate a syndrome, covering these cases, which he calls the choreo-psychotic syndrome, but in the writer's experience, the manifestations of psychic disorder have been so varied and irregular, that no one syn-

drome seems sufficiently inclusive, as the symptoms may range from simple irritability and mild memory defect to morbid fears, marked impairment of concentration, disorientation and mild confusion; in short, the symptomology of a psychoneurosis with, occasionally, that of a mild psychosis. These patients become apprehensive and hypochondriacal. Often they take on a childish behaviour, become whimsical and emotional and, in some cases, seem quite incapable of any prolonged mental effort. Though interest in life is at a low level in many of them, marked depression is seldom a feature; the tendency is rather to become childish, irritable and peevish.

With these distinct types may be mentioned the isolated cases, in which some injury to the cranial nerves persists. Of these the third nerve easily takes first place with the seventh a close second but persistent injury to the fifth, ninth and tenth (palate) has been noted.

Not less interesting is that group of cases, characterized by a disturbance in the sleep cycle which, fortunately, is of a temporary character. In the three cases seen by the writer, all recovered in from 8 to 18 months after the infection. The subjects of this group are children who have passed through a typical attack of fever and lethargy but who, in the course of a few weeks and without apparent evidence of other mental defect, have developed a peculiar reversal of the sleep cycle. The child remains awake during the night in spite of all that can be done to induce sleep and insists on sleeping soundly throughout the day.

These are some of the sequelæ of an attack of epidemic encephalitis, as noted, from day to day, in a general neurological clinic; as time goes on, one is, more and more, struck by the diversity of the mental and structural abnormalities that may follow in the wake of the primary infection.

While some of these abnormalities are the simple and isolated happenings in the course of a general infective process, many of them constitute very definite syndromes, which in the light of past

knowledge alone, would be classed as diseases. Is it then a far cry to the acceptance of the theory that many of the so-called degenerative diseases of the central nervous system, are but the result of some similar infection, and may we

not with ease subscribe to the belief that such diseases as paralysis agitans, Huntington's chorea, disseminated sclerosis and progressive lenticular degeneration are but the clinical scars that mark the trail of the real disease. F. H. MACKAY

ON THE NECESSITY FOR THE CAREFUL MEDICAL OVERSIGHT OF CHILDREN OF THE SCHOOL AND PRE-SCHOOL AGE

THE large percentage of defectives revealed by the late war not only in our own country, but in all others where medical inspections were made of recruits for the army, awakened not only our profession but all thoughtful minds to the necessity for a more careful medical oversight of all children during their early years of growth.

At the present many voluntary associations such as the Canadian Junior Red Cross, the Canadian Junior League, the Canadian Committee for the Study of Mental Hygiene and others, are putting forward strong efforts to increase our knowledge of the incidence of those diseases which are apt to give rise to physical defects in the growing child; also regarding the frequency in children of tubercular infection. Assistance in these efforts is also being given by both Federal and Provincial authorities and many of our municipal bodies are contributing to the regular medical inspection of our public schools.

All this in its way is very encouraging, but both the profession and the public should recognize how much remains still to be done and how much greater efficiency may be thrown into some of the work. The great advantages arising from the regular medical inspection of public schools with follow-up work carried on by carefully trained social workers, have already been manifested by a marked curtailment in the spread of infectious disease, and the rectification of defects in sight, hearing and breathing in the scholars. The removal of these

depressing conditions especially when associated with a proper dietary and good sanitary conditions at home stimulates bodily growth and mental activity and gives the children previously backward a fair chance in life.

Medical surveys also of the mental capacity of backward children in public schools by specialists have been recently undertaken under the direction of the Committee for Mental Hygiene, permitting the separation of those of defective mental powers into classes by themselves and enabling those with brighter minds to make more rapid progress.

But it is specially in reference to the incidence of tuberculosis in children of the school and also pre-school age, and the necessity for careful medical inspection and follow-up work at home that we desire to call the attention of our readers to the report of the medical examinations of nearly 1,400 children of school age in the Province of Saskatchewan. Much excellent work in the prevention of the spread of tuberculosis has been carried out in many Canadian centres by trained nurses under the Departments of Health or Education in homes in which cases of tuberculosis were known to exist, improving the nutritional and sanitary conditions, thus salvaging the lives of many children who might otherwise have fallen a prey to this fell disease. Open air schools, forest schools, and preventoria, and summer camps, have undoubtedly effected much good. In spite of these agencies statistics when available still show a high per-

centage of deaths in children from tuberculosis. In the Province of Ontario, the death rate from tuberculosis per 100,000 population in 1910 was 102. In 1919 in the same province, the rate per 100,000 population was 78, but the percentage of children under 5 years of age included in these figures was 6%. This age group percentage has never been below 5.2 during the ten years in question and has been as high as 7.2, in spite of the gradual decline of the general tuberculosis rate for this Province.

The Saskatchewan Anti-tuberculosis Commission have blazed the trail in the making of surveys regarding the incidence of tuberculosis in children for the whole Dominion. One of the first steps of its Chairman was to place the aims of the work and the method of dealing with it before the College of Physicians in the province, the members of which responded very promptly and gave every assistance. The result has been a most excellent and useful report. The Executive of the Canadian Association for

the Prevention of Tuberculosis have appointed at their last meeting a Committee to stimulate such investigations in every province, with the object of ascertaining the incidence of the disease and if possible its principal causative factors. At the same time a survey of the amount of bovine tuberculosis in each province is most desirable.

The knowledge thus obtained will be of great value not only to the medical profession but to the country at large, pointing the way to the most effective methods for controlling this disease. We hope the different public health interests in each province will respond to the requests of this Canadian Association and realize the necessity for such surveys. The Provincial Board of Health of Nova Scotia and the Provincial Red Cross of that province have set a good example by complying with the standards of survey suggested. Much good is to be anticipated from a concerted plan of investigation regarding the incidence and causative factors of this disease in children.

R. E. WODEHOUSE

THE ACTION OF HIGH ALTITUDES ON THE BLOOD

IN an article appearing in the Indian Journal of Medical Research for July 1921, Dr. Hingston speaks of the physiological changes which were found to take place in the blood on ascending from a low to a high altitude when climbing the mountains of India. If the ascent is gradual, blood cells are rapidly increased in number and acclimatization is complete but if the ascent is rapid, the corpuscles fail to be developed with sufficient rapidity, and the person suffers from mountain sickness. The recent expedition to the Andes for the purpose of further physiological investigation of life at high altitudes was originally planned by the Royal Society but later on received financial support from the Rockefeller Institute, from many medical institutions in the States, from the University

of Toronto, and from private individuals. One of the members of the Institute was Professor Meakins formerly of McGill University but now connected with Edinburgh University.

The Peruvian Andes were chosen for carrying out this research, not only because the Central Railway of Peru attains a height of 15,880 feet permitting easy ascent, but also possesses the advantage of having a large native population which had lived at this altitude for many generations, going back to a time before the occupation of the Spaniards and even the Incas. The town of Cerro de Pasca which is situated at a height of 14,000 feet above sea level is the third largest city in Peru, and has been the centre of a mining industry for hundreds of years. A report from

the Expedition has been published recently in the British Medical Journal, April 22, 1922.

"The members of the expedition suffered from mountain sickness in varying degrees. None of them slept well; some had short hours of sleep, and others, while sleeping the allotted hours, had fitful and broken rest. At the end of a month all of them were mentally quite exhausted. It was clear, however, from the activities of the mining staff, that a fair amount of mental work could be sustained for long periods at 14,000 feet, but with regard to muscular work there were evident limitations to the effort even of the most acclimatized. In some respects it was surprising how much exercise could be taken. Dancing and lawn tennis were possible so long as the exercise took place on the flat, but on even the gentlest gradient the limitation which the low barometric pressure placed on the powers was obvious. The natives could perform some remarkable feats, even to carrying 100 pounds of ore on the back from a mine 250 feet deep, but this was only done with frequent pauses, due to the necessity of squaring the oxygen account.

The facial appearance under these conditions underwent considerable change, especially in colour. Many of the natives were sallow, but those who were ruddy had cheeks which were purplish rather than pink. One of the mining engineers had an unusually fresh complexion, but not until the party saw him at sea-level subsequently did they discover that it was pink rather than purple. The actual colour of the arterial blood bore out this observation. If taken from the radial or brachial arteries, without exposure to air, the blood appeared to be venous in character, and was, in point of fact, usually about 85 per cent. saturated with oxygen, or, as the Americans said, 15 per cent. unsaturated. The lips and nails of the visitors were obviously

cyanosed on arrival, and this cyanosis, although it decreased, never entirely went away. Another interesting physical sign, which was often seen, though not present in the majority of the natives, was clubbing of the fingers, and several cases were examined in which this condition was found to be unassociated with any cardiac or pulmonary lesions such as might be suspected if the appearance was met with at sea-level. The shape of the chest, as indicated by X-Ray photographs, showed that the sternum was carried in an elevated position, and the ribs were more horizontal than in the case of normal people. This was true both of the American engineers and of the native population, but during the month of the party's stay none of the members acquired the habit of carrying the chest distended. The red blood corpuscles were found to be increased in numbers, up to between 6,000,000 and 7,000,000 in members of the party, while among the residents counts up to 8,000,000 were made, with corresponding increase in the hæmoglobin. There was also a marked rise in the reticulated red blood corpuscles observed among members of the party on arrival, and a corresponding fall subsequent to the descent. No nucleated red blood corpuscles were seen. The chemical changes in the blood were also of considerable interest, but in a general way they suggested that the blood acquired its oxygen more easily at high altitudes than at sea-level. Altogether, it was clear that life could be carried on in a comparatively satisfactory manner without the production of gross permanent disabilities, consistently with the degree of unsaturation of the blood already described, for no member of the party suffered from this stay in the heights of the Andes, and Mr. Barcroft believed that there was no suffering among the mining community, at all events during the first five decades of life."

The Association

ANNUAL MEETING, WINNIPEG,

JUNE 20-23rd, 1922

THE arrangements for the Meeting have been progressing favourably and there is every indication that the meeting will be a notable one in all respects.

In both Canadian Pacific and Union Depots, information booths are being established and visitors on arrival should go to the booth and obtain their hotel reservations and general directions. In this connection it may be stated that the Committee on Hotels are very anxious to arrange reservations early for everyone. The filling in and mailing of the post card included with the prospectus which has been mailed to every medical man in Canada, will greatly facilitate matters.

A large number of automobiles belonging to the physicians of Winnipeg have been placed at the disposal of the Local Committee for use during the meeting. These will be plainly marked and are for the use of visitors—USE THEM.

Many special entertainment features are being arranged and abundant facilities for golf will be available.

The sessions on Tuesday, June 20th, are for business only but many matters of extreme interest and importance to the profession at large will be discussed and a large attendance is hoped for. There will be social entertainment features for this day also.

The following constitutes the Scientific Programme:

MEDICINE

Wednesday, June 21, 9-12:30

Barker, L. F.: Address, 20 minutes.

Banting and Best: "Diabetes"; Treatment of Experimental Diabetes and Diabetes Mellitus with Pancreatic Extracts.

Cumming: "Diabetes."

Pierce, S.: "Blood Cholesterol."

Thursday, June 22, 9-12:30

McPhedran, J. H.: "Psychical Conditions in General Medicine."

Russel, C. K.: "Epidemic Encephalitis and the influence of Horse serum in treatment."

McKenzie: "Functional Paraplegia," with case report.

Hunter: "Application of the new Psychology by the Internist and General Practitioner."

Burridge, A. J.: "Auricular Fibrillation."

Friday, June 23, 9-12:30

Martin, C. F.: "Observations on some Methods of Examination in Gastric Disease."

Goldie, W.: "Reasons for the Variation of Symptoms in Gastric Ulcer."

Brown Alan: "Effect of a High Protein Diet in the Treatment of Chronic Intestinal Indigestion in Children."

Young, F.: "Direct Measurement of Venous Pressure."

SURGERY

Wednesday, June 21, 9-12:30

Campbell, A. McK.: "Modern Viewpoints on Abdominal Surgery," with lantern slides.

Carman, R. D.: "The Limitations of Roentgenologic Diagnosis"; Address.

McMecham, P. H.: "Safety-First in Anaesthesia."

Graham, R. R.: "Surgical Aspects of the Gall Bladder Problem."

Boyd, W.: "Studies in Gall Bladder Pathology."

MacKay, D. S.: "Some Observations on the Treatment of Pelvic Inflammation with Radiant Heat."

McKenty, J.: "End Results in Duodeno-jejunostomy."

Thursday, June 22, 9-12:30

Finney, J. M. T.: "End Results in Operations for Gastric and Duodenal Ulcer".

Ridson, F.: "Plastic Surgery of the Head and Neck," with lantern slides.

McKenzie, D. W.: "Mechanical Factors in Infections of the Renal Pelvis".

Bruce, H. A.: "Hypernephromata."

Seng, M. I.: "The Prostate Problem Simplified."

Gordon, C. S.: "A new Cysto-urethroscope for examining and operating on any part of the Urinary Tract by Direct Telescope and Indirect Periscope Methods."

Cromarty, R. P.: "Some Observations in Surgery of the upper abdomen with special reference to Gall Bladder; Duodenal membranes."

Boardman, E. J.: "When to operate on Renal Calculus."

Brandson, B. J.: "Perforated Duodenal Ulcer."

Friday, June 23, 9-12:30

Aikens, H. B.: "Radium Therapy; Lantern slide demonstration."

Primrose, A.: "Tumours of the Breast; Malignant and Benign."

Bazin, A. T. and Gurd, F. B.: "Lung Abscess."

Dean, R. D.: "Coxa Plana; Diagnosis and Treatment."

Keenan, C. B.: "Plating in Compound Fractures."

Gibson, A.: "Fractures of the Os calcis."

Gardner, W. A.: "Osteo-arthritis."

GENERAL MEETINGS

Wednesday, June 21, 2-4:30

Cole, L. G.: "Roentgen Indications for Surgical Procedures in Gastric Ulcer."

Finney, J. M. T.: "Spasmodic Torticollis."

Todd, J.: "The Fruits of Medical Research."

Thursday, June 22, 2-4:30

Montgomery, E. W.: President's Address.

Barker, L. F.: Address.

Miller, J.: "Tuberculosis."

Stewart, D.: "Intestinal Tuberculosis."

Friday, June 23, 2-4:30

McGregor, J. K.: "Exophthalmic Goitre".

Howard, Campbell: "Some Phases of Dys-thyroidism".

Starr, F. N. G.: "The Goitre Problem from the Patient's Standpoint."

McKechnie, R. E.: "Some thoughts on Goitre."

Riggs, W.: "Diagnosis and Treatment of Hyperthyroid Goitre."

Note: Wednesday, June 21, at 8:15 P.M.

Public Meeting to be addressed by Drs. Barker and Finney.

Lieutenant-Governor, R. G. Brett, Chairman.

The Local Committee have tried to make the meeting a genuine success but this can only be assured by a large attendance of the profession from all over Canada.

Everyone will be made welcome. Winnipeg and Western Canada generally will be at their best. It will be worth while coming.

Cerebral Embolism following arrest of Auricular Fibrillation by Quinidin.—The diagnosis in the case cited by FRANK N. WILSON and GEORGE R. HERRMANN, Ann Arbor, was cardiosclerosis with auricular fibrillation and heart failure. The patient was given two preliminary doses of quinidin sulphate, 3 grains (0.2 gm.) each, which produced no unusual symptoms. On the following day (January 21) he received three doses of 6 grains (0.4 gm.) each at four hour intervals. Aside from a conspicuous increase in heart rate, no special effects were noted. After a fourth dose of the drug on the following morning, it was found that his pulse had become regular. About eight hours later he

complained of sudden numbness of the left side of the body and left extremities, and of being unable to see well objects to the left of him. Examination revealed weakness of the left arm, diminished knee jerk on the left, and left homonymous hemianopsia. He was seen by Dr. C. D. Camp, who made a diagnosis of "extrapyramidal hemiplegia due to a lesion in the neighborhood of the right optic thalamus." Up to March 1 the auricular fibrillation had not returned. The neurologic signs were still present but less conspicuous. There can be little doubt that they were the result of cerebral embolism.—*Jour A. M. A.*, March 25, 1922.

Abstracts from Current Literature

SURGERY

The Management of Acute Cranial Injuries by the Early, Exact Determination of Intracranial Pressure, and Its Relief by Lumbar Drainage. Jackson, Harry, : *Surg. Gynec. and Obstet.*, April, 1922. Page 494.

In acute brain injuries the increased intracranial tension due to oedema and hæmorrhage of the brain is the important finding, and interferes with the normal absorption of the cerebro-spinal fluid. The usually waited for symptoms of slow pulse, high blood pressure and stertor are due to medullary pressure and are precursors of death. The only method of sure and early diagnosis of increased intracranial pressure is the use of the spinal mercurial manometer. Dr. L. H. Landon's instrument is used and its readings are a safe and accurate record of the intracranial pressure. This by no means corresponds with the blood pressure reading and its increased reading shows hours in advance of the onset of medullary pressure symptoms. Treatment can be carried out under its control, reducing by lumbar puncture the pressure to normal or to half of the maximum reading obtained. This relieves subtentorial pressure as subtemporal decompression cannot do. The author's findings are based on one hundred cases of acute cranial injury and on experimental work on dogs. Quinke, prior to 1891, always measured the intracranial pressure when doing lumbar puncture, and found the normal to be between 90 and 100 m. m. of water. The cerebro-spinal fluid is secreted almost entirely by the choroid plexus in the ventricles and is absorbed by the arachnoidal villi along the sinuses especially the longitudinal sinus. Any swelling or oedema due to brain injury interferes with the absorption, flattens the cortex and endangers the medulla. It is well shown there is no danger in spinal puncture in acute head injuries such as occurs in brain tumour cases and lumbar puncture decompression can easily and safely be carried out once in twelve hours or less often. An increased blood pressure early in these cases is rare because of shock. The danger of lumbar puncture is nil in the horizontal posture if not more than 10 to 20 c. c. are removed slowly. Sharpe has done 1,100 lumbar punc-

tures in the last three years without a death. Usually the blood pressure falls slightly after the spinal puncture. Thirty c. c. cerebro-spinal fluid exists in the ventricles, 60 c. c. in the cisterna, and 30 to 60 c. c. in the spinal canal. In 547 cases of autopsy of skull fracture in the Cork County Hospital, LeCount, between 1911 and 1918 found: 20% showed extra dural hæmorrhages from rupture of the middle meningeal artery; 95% of all fractures showed subdural injuries. The most frequent finding was *traumatic oedema* of the brain.

In the diagnosis of intracranial injury, the finding of blood in the cerebro-spinal fluid and of increased pressure as indicated by the manometer is of more importance than X-Ray examinations; and the usual so-called symptoms of compression of the brain as papilloedema, slow pulse, high blood pressure, etc., should not be waited for. If the pressure is high with clear fluid, we should suspect middle meningeal hæmorrhage. The author advocates repeated puncture, every 6 to 24 hours, to reduce pressure.

In 14% the spinal pressure was above 30 m. m., one case reaching 60 m. m. In 34% it was between 20 and 30 m. m., in 44% between 10 to 20 m. m. He has reduced the mortality rate from 50% to 25%. He divides his cases into four groups: (a) Very severe crushing injuries with medullary injury, dying within a few hours, or at least within 24 hours, 13.3%. Pressure readings were 12 to 60 m. m. There is no treatment of value. (b) Mild brain injury with unconsciousness, normal or slightly plus readings up to 12 m. m., with no blood. These recover in 24 to 72 hours. They comprised 26.6% of cases, none were fatal. (c) Moderately severe cases, with or without fracture, or contusion of brain. Puncture shows blood in the fluid and pressure is 12 to 22 m. m. Reflexes are altered and there is temperature elevation. Here 10 to 20 c. c. of fluid were removed. They formed 42.2% of cases, mortality 3%. (d) Very severe brain injuries; bloody fluid under pressure of over 22 m. m. They were 20% and mortality was 6%.

The animal experiments showed that the slow pulse and rise in blood pressure, etc., were due to medullary compression. CHAS. K. P. HENRY

The Diagnosis and Treatment of Some Common Injuries of the Shoulder Joint.

Lovett, R. W.: *Surg. Gynec. and Obstet.*
April, 1922, Vol. xxxiv, page 437.

As an introduction the writer reviews some important anatomical conditions which are found in relation to the shoulder joint. In the process of evolution the joint which is purely a hanging one, is forced to support the arm. This is accomplished, not by the capsule, but by the surrounding muscles, biceps, triceps, coracobrachialis and deltoid. Abduction of the arm depends on fixation of the scapula by means of the trapezius, rhomboids, pectoralis minor and serratus magnus. Certain muscles are very intimately related to the joint. The subscapularis merges with the front of the capsule while the infraspinatus passes across the posterior surface. The long head of the biceps passes through the joint capsule. The floor of the subacromial bursa is only separated from the capsule by the tendons of the short rotators. The pectoralis major and latissimus dorsi muscles in being more powerful than the deltoid and supraspinatus, favour an adducted position of the arm.

In many shoulder-joint injuries, so many structures are involved that it is impossible to identify any particular one. The writer considers that the diagnosis of subacromial bursitis is much too freely used, and urges the further examination in these conditions to see if a more exact descriptive diagnosis cannot be discovered. No symptom is essentially diagnostic of subacromial bursitis. Any tearing or stretching of the capsule produces limitation of abduction and rotation. Certain muscles such as the deltoid, biceps and internal rotators are commonly strained. Active contraction will be painful and the pain most likely referred to either the origin or insertion. In the case of the deltoid, passive motion in a certain direction may be allowed while the active motion is painful. If the biceps is involved, flexion of the forearm, or supination will cause pain. Tenderness and crepitus may be elicited in the bicipital groove. Pain in internal rotation may be due to injury of the pectoralis major, subscapularis or the anterior portion of the capsule. Severe reaction in the shoulder-joint associated with inability to abduct the arm, and tenderness over the tip of the shoulder may be due to a rupture of the supraspinatus insertion. If a piece of bone is pulled off the X-Ray will confirm the diagnosis. Synovitis, which is infrequent, produces first, limitation

of rotation followed closely by abduction. Tenderness below and outside of the coracoid is acute.

In the treatment of injuries of the shoulder-joint, the arm should be abducted to take off the weight from the capsule and supporting muscles and to relieve pain. The abducted position prevents adhesions due to the pull of the pectoralis major and latissimus dorsi. This position is best secured by means of the platform splint of wire or plaster of Paris. It is an improvement to flex the elbow to a right angle and have the forearm in supination. It is not necessary to wear a splint at night except in very severe cases. Light massage with electric light baking should be commenced as soon as the acute stage is over. Where adhesions are already present it is wise to fix the arm to relieve the pain and then commence gradual abduction by means of a pad between the elbow and the body. Manipulation should be carried out every second day but not sufficient to cause any reaction. In cases where the supraspinatus has been torn away from the bone and where the X-Ray reveals that abduction does not replace the bone fragment, an open operation should be performed according to the method suggested by Robert Jones.

GEO. A. FLEET

UROLOGY

Focal Infection and Selective Localization of Streptococci in Pyelonephritis; Study I.

I. Bumpus, H. C., Jr.; and Meisser, J. G.;
Arch. Int. Med., March, 1921; Vol. 27, page 326.

Because of the almost constant presence of the colon bacillus in the urine of patients suffering from pyelonephritis, most investigators have concentrated their attention on this organism as the etiologic factor of the disease.

A colon bacillus bacteremia has been found in about 40% of cases following on the chill resulting from the removal of residual urine in prostatism. The close lymphatic connection between the bowels and the kidneys has led most observers to ascribe to the colon bacillus the contributory role. The attempt, however, to produce pyelonephritis experimentally in rabbits by an intravenous injection of colon bacilli obtained from human cases has not been successful.

The factor of oral sepsis has been rejected, owing to the fact that colon bacilli are rarely isolated in such foci. The work of Rosenow on the elective localization of streptococci has led

the authors to carry out some work in this field. They selected a number of patients with pyelonephritis, in whom oral sepsis was present. Cultures were made from extracted teeth, and green-producing streptococci were always isolated. Similar cultures were made from removed tonsils. In the latter case, the flora were more varied, but the green-producing streptococci were always present.

The rabbits were injected intravenously with three to five c. c. of such cultures, proper control tests being carried out. The rabbits were killed after three to six days and cultures made from various body organs. Of 27 rabbits injected, 24 had lesions in the kidney, 8 in the bladder, 4 in the muscles, 3 in the stomach, 3 in the endocardium, 2 in the myocardium and 4 in the joints, the lesions outside of the urinary tract being relatively slight in each instance.

The streptococci obtained from the kidneys of rabbits with lesions following the injection of the streptococci, were submitted to a second animal passage. 11 rabbits were injected with cultures from three strains. 7 had lesions in the kidneys, 1 in the kidneys and bladder, and 1 had lesions in the bladder, 1 had slight lesions in the muscles, 1 in the stomach and 1 in the myocardium. In a third animal passage, 6 rabbits were injected with cultures from two strains; 3 developed lesions in the kidneys, none of the six showed evidence of lesions in any other organs.

The authors conclude that the marked affinity of this class of streptococci for the urinary tract is significant. That it was not accidental seemed to be proved by the fact that of 208 animals injected under the same conditions with streptococci from patients with diseases other than urinary infections, only seven developed lesions in the urinary tract. The pathological picture in all rabbits was always that of a localized infection of the kidneys.

The authors conclude from this study that pyelonephritis may often be due to focal infections harbouring streptococci which have a selective affinity for the urinary tract, and that the colon bacillus which is commonly found and generally believed to be the cause, is of secondary importance.

F. S. PATCH

Foci of Infection in Cases of Pyelonephritis.

Study II. Bumpus, H. C., Jr., and Meisser, J. G.; *Jour. Am. Med. Assoc.*, November 5th, 1921; Vol. 77, No. 19, pp. 1,475.

The authors in this study report further pro-

gress and give the results obtained in a series of six additional cases.

Added to the results of the six cases previously reported, 82 rabbits have been injected with strains of the green-producing streptococci obtained from the teeth, tonsils, urine and blood of patients suffering with pyelonephritis, and in 63 of the animals lesions of the kidneys were found.

Of interest is the clinical finding, that following the extraction of the suspected focus in the teeth, an acute exacerbation of the urinary symptoms usually occurred, accompanied by chills of more or less severity and a rapid rise of temperature. The authors regard these reactions as clinical manifestations of the specificity of the bacteria released from the removed focus, and believe that the increase in the severity of the disease is an indication that the right focus has been eliminated. They point out that prior to the eradication of the specific foci only colon bacilli were obtained from the urine, and that following the eradication of the foci, streptococci appeared for a time. Specimens of these mixed cultures from the urine containing both colon bacilli and streptococci were injected intravenously into 10 rabbits, and lesions of the urinary tract occurred in six animals, although when the colon bacilli alone were injected, lesions did not result.

F. S. PATCH

Actinomycosis of the Urinary Organs.

Cecil, H. L., and Hill, J. H.; *Jour. Am. Med. Assoc.*, February, 25th, 1922; Vol. 78, No. 8; p. 575.

This instance of infection of the genito-urinary tract is reported from the Brady Urological Institute. Ten similar cases only are found in available literature. A male, aged 35, who had a stricture of the urethra, entered hospital for repeated attacks of pain in the kidneys, accompanied by chills, fever, and pyuria without frequency or hæmaturia. Examination revealed a bi-lateral infection of the kidneys.

The cause of the infection was not at first recognized, owing to cultures not being incubated sufficiently long. The presence of a few branching filaments in direct smears of centrifugalized urine led the authors to suspect actinomycosis. A longer incubation showed the characteristic forms of actinomycosis. The actinomyotic infection was complicated by infection with another organism, *Pseudomonas-pyocyanea*.

All treatment to date has been of no avail, and owing to the bi-lateral infection, nephrectomy is definitely contra-indicated. F. S. PATCH

MEDICINE

On The Curability of Gastric Ulcer. Diamond, J. S.; *Am. Jour. Med. Sc.*, April, 1922.

The author deals with an extremely interesting subject, which has naturally been a subject of controversy for many years. His contribution deals with fourteen cases of gastric ulcer of the lesser curvature which have been subjected to medical treatment for a period of years. He contends that the type of gastric ulcer most amenable to medical treatment is that existing on the lesser curvature. He draws attention to the fact that peptic ulcers, by virtue of their different anatomical locations, produce marked alterations in the normal physiological gastric function and have a varied train of symptoms. In this way each ulcer forms a definite clinical entity which can be differentiated and recognized.

After citing in detail his fourteen cases, he concludes that there is sufficient evidence to believe that they are healed in the generally accepted use of that term. A cure is assumed when a patient has remained free from symptoms for several years and has gained weight on a liberal diet. There are, of course, exceptions to this rule. From the etiological standpoint, it may well be maintained that no ulcer is ever curable, at all event not until the cause of the ulcer is discovered.

With reference to the surgery of gastric ulcers, he cites the following classifications of types for operative intervention:

1. Acute perforations.
2. Chronic perforating ulcers in which a communication of the lumen of the stomach with the neighbouring tissues has been made, causing a separate small gastric pouch or sac.
3. Chronically bleeding ulcers.
4. Hour-glass contractions.
5. Cases with frequent recurrence of symptoms, indicating the failure of medical means to control the symptoms.

C. F. MARTIN

On Splenic and Hepatic Enlargement in Endocarditis. Arnett, J. H.; *Am. Jour. Med. Sc.*, April, 1922.

The author considers that subacute endocarditis is often overlooked and that splenic en-

largement, as one of its diagnostic features, has been rather neglected. He concludes that the spleen is often greatly enlarged in patients who die of an acute or recurring endocarditis, and that this enlargement occurs independently of increase in the size of the liver.

Enlargement of the spleen is, of course, present with non-cardiac streptococcic infections, and in his study of 286 cases, he finds evidence that the enlargement is due rather to infection than to back pressure or infarction. He suggests that a more frequent and thorough physical examination of the splenic area would assist in the diagnosis of these conditions.

C. F. MARTIN

The Late Treatment of Chorea. Irving, Geo. R. *Arch. Pediat.*, March, 1922.

In recent years there has been a decided tendency in the treatment of chorea to emphasize the importance of means other than medication. Increasing importance is attached not only to rest but to moderate exercise during convalescence as a means of minimizing the recurrence of the disease. For this reason he suggests, after dealing with 115 children, that supervised activity in the late treatment of chorea is of benefit, that no harm can come from such a course of treatment, either to the chorea itself or to any cardiac complications. He emphasizes, moreover, the importance of open air in the treatment to encourage the moral, physical and bodily improvement of the child, as well as his mental upbuilding.

C. F. MARTIN

Bacillus Acidophilus and its Therapeutic Application. Rettger, L. F., and Cheplin, H. A.; *Arch. Int. Med.*, March, 1922.

The use of this organism in the treatment of intestinal conditions has recently excited a great deal of interest. In many ways the bacillus is indistinguishable from the *B. bulgaricus*; its essential difference, however, is that relating to intestinal implantation; while the *B. bulgaricus* is unable to live and multiply in the intestine of man, the *B. acidophilus* undergoes rapid development when administered by mouth, or as the result of milk, lactose or dextrin feeding. As a result, the ordinary intestinal bacteria are greatly diminished in number.

The authors have shown that the flora may be entirely changed within four or six days by the daily administration of 300 c. c. of pure whey-broth cultures of the organism; in fact, the *B.*

acidophilus was often present in the faeces to the extent of 90 per cent. of the cultivable bacteria. Similar results were obtained when 150 c. c. of the culture and 150 gm. of milk sugar were given in place of the requisite amount of culture alone.

In experiments upon patients with a long history of intestinal disturbances, the predominance of the organism to the extent of at least 80 per cent. of the total flora of the faeces, was brought about at will. With the co-operation of practising physicians, they soon discovered that the acidophilus milk was much to be preferred to lactose broth or whey-broth cultures of the organism, and it was much more easily tolerated.

The bacillus does not elaborate toxic or other harmful products. The authors regard the viable cultures of the germ as of particular importance in the treatment of chronic constipation and diarrhoea. Furthermore, it was regarded as of distinct benefit in the treatment of any ailment in which the function of the digestive system is disturbed, more especially the intestine. It is, of course, not a cure for all kinds of ailments, nor is it an elixir of life, as at one time Metchnikoff's *B. bulgaricus* was regarded. There is no use in employing acidophilus tablets and powders, for the pure cultures must be used in a proper manner. Experiments are under way for the preparation of *B. acidophilus* milk which will be available under conditions ensuring its viability and purity.

C. F. MARTIN

Renal Glycosuria. Lewis, D. S.: *Arch. Int. Med.*, April, 1922.

The author draws attention to the four cardinal points in the diagnosis of this anomaly:

1. The presence of glycosuria without hyperglycemia.
2. Little, if any, relationship between the carbohydrate intake and the amount of glucose excreted in the urine.
3. The absence of the signs and symptoms characteristic of diabetes mellitus.
4. The non-development of diabetes itself after a long period of observation.

It is this last feature especially upon which particular stress should be laid in determining the diagnosis.

Three cases have been studied in detail, one of which had been observed for a period of six years. This patient still presents a marked glycosuria without symptoms and presents a normal amount of sugar in the blood; he is apparently in excellent health.

In the second patient, one with chronic diffuse nephritis, the glycosuria appeared while under observation, and was entirely independent of any of the ordinary signs of or tests for diabetes.

In the third patient, one with arteriosclerotic kidney, the glycosuria was observed at the first examination, while the date of origin is unknown. It had been observed for fifteen months. Like the other two patients, there were no signs of diabetes mellitus.

The writer refers in conclusion to the two types of renal glycosuria, the one of unknown origin with a normal blood sugar curve, the other associated with a chronic nephritis in which there is a remarkably high and prolonged rise in the blood sugar, which is evidently a retention phenomenon.

C. F. MARTIN

Post-Operative Lung Lesions. Cutler, E. C., and Hunt, A. M.: *Arch. of Int. Med.*, April, 1922.

This is the third of a series of articles on this subject by the same authors. They deal at some length with the complications that arise from various causes and bring forward statistical evidence, clinical investigations and pathological reports in support of their theories.

For the most part the anaesthetists and the anaesthesia are exonerated from blame; these complications are mainly due to embolism from the operative field; with resulting infarctions or fatal embolism. The causes of these infarctions are either trauma, mobility of the part, or sepsis, and the prognosis is usually good.

Inhalation anaesthesia, with resulting irritation and aspiration, causes but a small percentage of complications, and these are usually of the nature of a bronchitis or pneumonia.

Statistics show, too, that the same relative proportion of complications occur where local anaesthesia is used, thus demonstrating that the anaesthetist or general anaesthetic is not responsible as a rule. The prevention of complications may be helped by reducing the trauma at operation; by accurate haemostasis; the control of sepsis, and due regard and caution in operating upon patients who have demonstrable pulmonary disease.

C. F. MARTIN

Calcium in Heart Therapy. Singer, G.: *Therapeut. Halbmonatshefte*, 1921, Hft, 24.

Calcium therapy has been somewhat in vogue in cardiac insufficiency and decomposition, more

often in combination with digitalis. Repeated small doses of calcium chloride or calcium lactate by mouth, or the calcium chloride combined with an infusion of digitalis, seems to have a favourable action. The use of Novasurol, one of the newer combinations of calcium and digitalis, is recommended by the author in the severer forms of decompensation. It is especially commended in the severest forms of stasis, either with or without hypertension. For that reason it is recommended in the cardio-renal syndromes. The introduction of calcium not only excites diuresis and more readily stimulates the action of the digitalis, but at the same time counteracts the associated effect on the vagus and the gastrointestinal canal.

C. F. MARTIN

On the Effect of Intravenous Glucose Injections on Heart Function and Diuresis.

Isaac, S.: *Therapeut. Halbmonatshefte*, 1921 Hft, 22.

The action of hypertonic sugar solutions, (in so far as it is present at all), rests upon the osmotic influences produced, not on the sugar content itself. An advantage exists here, in that, after the osmotic effect is produced, the sugar is burnt. Many patients feel subjectively much better after the injections. In cardiac insufficiency the injections do not bring about any essential improvement in the circulatory weakness. Localized cedemas may, however, be favourably influenced by the injection of highly concentrated sugar solutions up to 50 per cent. C. F. MARTIN

Allergy in Infants and Children.—A review, together with a considerable amount of experimental work, is given by Schloss (Cornell Univ. Med. Bull., July, 1921) on the subject of allergy in children. For testing the susceptibility of the patient he prefers to employ the cutaneous test rather than the intracutaneous injection of the foreign substance. His objections to the latter are that it is not infrequently followed by infection, owing to the difficulty in obtaining sterility of the protein extracts, that it may give rise to a severe general reaction, and that it is often complicated by pseudo-reactions which add to the difficulty in interpreting the results. An important point to be observed in making the test is to assure oneself that none of the particular protein to be tested has been taken in the food during the preceding few weeks, as a period of temporary desensitization lasting from twenty-seven to forty-five days may follow such ingestion. He finds a close similarity between food allergy and anaphylaxis; for instance, he has been able to sensitize guinea pigs passively by injection of the patient's blood serum. The sensitization in children appears in some cases to be a congenital one, in others acquired. With regard to the clinical types of allergy he shows that many conditions in children—such as bronchial asthma, urticaria, angioneurotic oedema, erythema multiforme, eczema, acute dermatitis, and certain cyclic disturb-

ances—may sometimes be referred to a hypersensitivity to one or more varieties of foreign protein. Treatment may be carried out (1) by eliminating the offending substance from the diet; (2) by hypodermic injection of the protein to which the patient is sensitive; or (3) by actively immunizing the patient by feeding. According to Schloss, in either of the two latter cases the progress of desensitization should be controlled by means of the cutaneous reaction.—*Brit. Med. Jour.*, December 10, 1921.

Danger from Automobile Exhaust Gases.—

At the suggestion of the Surgeon General of the United States Public Health Service, the State Commissioner of Health has issued a warning regarding the danger to health and life from the inhalation of exhaust gases from automobiles. The effect of these gases is produced very quickly, usually before the victim realizes the danger. The following precautions should be observed in all garages: (1) Always open the garage door before starting the engine. (2) Do not allow the engine to run for any length of time in a closed garage. (3) Do not work near the exhaust of a running automobile engine. (4) Special precautions as to ventilation are necessary when in garage pits. (5) When the exhaust is used for heating a closed car the system must be free from leaks.

News Items

NOVA SCOTIA

SUMMARY OF RECENT VISIT OF DR. McMILLAN
TO HALIFAX, N. S.

OLDEST living Graduate of Dalhousie Medical College visits Halifax Health Centre. Dr. Finlay McMillan graduated in Medicine from Dalhousie University in 1872 and has been in active general practice ever since. He is now in his 80th year, but was very much interested in the work of the Halifax Health Centre.

In a rather extended notice of his visit in one of the city papers, the Reporter writes as follows regarding his appearance: "Of an erect, almost military carriage, slight wiry boyish figure, and vibrant personality, Dr. McMillan, seen at the Health Centre by an Evening Echo Reporter yesterday, looked to be in the prime of life, yet he was seventy-nine on Christmas Day and graduated from the Dalhousie Medical College fifty years ago. He is

still in active practice which has kept him busy ever since he graduated."

THE Cumberland County Medical Society which has been dormant since 1913 was re-organized at Amherst on May 3rd, 1922. Officers were elected as follows: President, Dr. D. MacIntosh, Pugwash, N. S.; Vice-President, Dr. W. Rockwell, River Hebert; 2nd Vice-President, Dr. Wardrope, Springhill; 3rd Vice-President, Dr. MacKenzie, Parrsboro; Secretary-Treasurer, Dr. W. T. Purdy, Amherst, N. S.

It was furthermore decided that the Society should affiliate with the Provincial Organization and Doctors J. Munroe and A. E. MacIntosh represent the Society on the Executive of the Medical Society of Nova Scotia. After the Meeting, the out of town doctors were entertained by the local doctors, at a supper.

QUEBEC

THE PROVINCE OF QUEBEC MEDICAL
ASSOCIATION

THE inaugural meeting of the Province of Quebec Medical Association took place on May 11th and 12th, 1922, in Montreal, thereby bringing together over two hundred of the members of the French and English-speaking profession on a common ground for the advancement of the Art and Science of Medicine in the Province. It was an event of no ordinary importance and the enthusiasm with which the project was received leaves no doubt as to its permanent success.

During the two days' session, clinics and demonstrations were held in the Royal Victoria Hospital, the Hôtel-Dieu, the Notre Dame and Montreal General Hospitals.

The acting President of the Association was Dr. S. Grondin of Quebec, who officially opened the sessions on the first morning in the large theatre of the Royal Victoria Hospital. After the few introductory remarks, the members of the Staff of the Hospital presented clinical cases and exhibits, followed in two hours by a visit of the members of the Association to the various clinics and laboratories of the Hospital, where special demonstrations were held and matters of interest were discussed. Luncheon was served in the staff dining room of the Hospital, about two hundred sitting down to a light collation.

The Hôtel-Dieu was next visited, where a similar programme was carried out. At 4.30 p. m. Father Molinier, representing the American College of Surgeons, gave an address on "Hospital Standardization", which was followed by some remarks from Dr. Malcolm McEachern of Vancouver, B. C.

In the evening the Presidential Address was given by Dr. Grondin. In the course of his remarks, he outlined briefly the history of clinical teaching and drew attention to the developments which had taken place since the University of Leyden held its first clinic in the 16th century. The officers and executive committee were then elected, after which Dr. Simard of Quebec brought forward the question of the Workmen's Compensation Act in its re-

lation to practitioners. After the meeting, the members adjourned to a smoking concert, which was largely attended, an excellent programme being provided.

The second day of the Congress was opened at the Notre Dame Hospital, where the members of the Staff again presented cases and where the visitors were given an opportunity to see the work of the institution in the wards and laboratories. The members then adjourned to the Cercle Universitaire for luncheon as guests of the Notre Dame Hospital Staff.

In the afternoon the theatre of the Montreal General Hospital was the scene of a demonstration by the Staff of cases of general interest, followed by further demonstrations in the wards and laboratories of the institution.

The evening was devoted to a session of the Provincial Branch of the American College of Surgeons.

All in all, the meeting undoubtedly augurs well for the members of the profession in the Province of Quebec, and the entente cordiale for the future is better than it has been for many years. By thus linking together the members of the French and English-speaking profession, it is felt that their mutual interests will be greatly augmented both in a personal and public way, and that their combined action may not only be of scientific value but may stimulate interest on the part of the Government in the affairs that concern the medical men of the Province.

The officers for the coming year are as follows:—President, Dr. S. Grondin, Quebec; Vice-Presidents, Dr. L. de L. Harwood, Dr. W. G. Reilly, Dr. C. F. Martin; Secretaries, Dr. Grant Campbell, Dr. J. U. Garipey; Treasurer, Dr. E. E. Trottier; Executive Committee, Dr. P. C. Daigneault, Quebec; Dr. P. Z. Rheame, Dr. Raoul Masson, Dr. St. Jacques, Dr. A. F. Mercier, Dr. Rousseau, Dean of Laval University, Quebec; Dr. F. G. Finley, Dean of the Faculty of Medicine McGill; Dr. J. Alex. Hutchison, Dr. W. W. Chipman, Dr. L. Leclerc, Quebec; Dr. L. P. Normand, Three Rivers; Dr. Gordon Hume, Sherbrooke.

The President and Secretary of each Medical Society in the Province, is *ex officio* a member of the General Committee.

*Programme, Royal Victoria Hospital,
May 11th, 1922, 10 a. m.*

Adherent Pericardium with Cor Bovinum—Cases of Gastrostomy—Geo. E. Armstrong.

Cases illustrating the palliative treatment of incurable cancer of the tongue and fauces—Traumatic Stricture of the Aesophagus—A. E. Garrow.

New Treatment of non union of old fracture of neck of femur (slides)—W. G. Turner.

Demonstration of New Ether Mask—W. B. Howell. Clinical observation on Ruptured Heart with specimen—Intussusception with Specimen—C. F. Martin and Dr. Waugh.

Protein reactions in Bronchial Asthma—A. T. Henderson.

Encephalitis with illustrative cases—Cerebro Spinal lues. Diagnostic points and treatment—C. Russel.

Heart Block due to Digitalis—C. F. Moffatt.

Report on Experimental evidence of adrenalin in the blood of exophthalmic goitre patients—F. A. C. Scrimger.

Oedema of the feet, result of functional paralysis—Septic Arthritis as Sciatica—C. B. Keenan.

Septic Knee, Wilm's Method of treatment—F. E. McKenty.

Ureteral Calculus—Suprapubic Prostatectomy—Urological Cases—Lantern Demonstration—D. W. McKenzie.

Infant Feeding and cases of Rickets—Pneumonia—Tuberculosis and Chronic Intestinal Indigestion—F. M. Fry, Dr. Williams and Dr. Stewart.

Metabolism, Ward S. Cases of Diabetes and Nephritis—E. H. Mason.

Ophthalmological Cases—W. G. M. Byers, F. J. Tooke, J. A. McMillan.

Post Operative Mastoids—B. Ballon.

Two cases of Coloboma of the Iris in the same family—J. Rosenbaum.

Retro-pharyngeal Abscess—Stricture of the Aesophagus—Carcinoma of Vocal Cord removed through Laryngofissure—Gumma of Nasal Septum—X-Ray plates of Sinuses and Mastoids—J. T. Rogers.

Operative Case. Repair of complete perineal laceration—W. W. Chipman.

Tuberculosis and pregnancy—Ovarian Cystoma—Fibroid with gangrenous prolapse from Vulva—H. C. Burgess.

Intestinal tuberculosis—E. W. Archibald.

The electrocardiograph demonstration of its uses—Normal tracings—The principal abnormal tracings—C. F. Moffatt.

Pathological Specimens—H. Oertel, C. T. Crowdy and Dr. Waugh.

X-Ray demonstrations of interesting Stomach Cases by viewing boxes and fluoroscopically—A. H. Pirie and H. H. Cheney.

Lunch at 1 o'clock in Staff Dining Room.

*Hotel-Dieu, jeudi II mai 1922,
à 2 heures p. m.*

Hémoclasie digestive pour fonctions protéopéptique et glycogénique—Dr. Gauthier.

Syndrome d'Addison et surrénalite hyperplasique en rapport avec tuberculose pulmonaire et intestinale—Dr. Latreille.

Progrès en radiologie—L. Pariseau.

Cancer du rectum, diagnostic différent procédé opératoire—E. St. Jacques.

Néphrite chronique, diagnostic et traitement—Présentation de malade—Dr. Dubé.

Oto-rhino-laryngologie. Présentation de malades.—Dr. Lassalle.

Rein unique; calcul urétéral—D. A. Hingston.

Vaccinothérapie dans un cas de fièvre puerpérale—Un cas de cholécystectomie—A. Saint-Pierre.

Anus contre nature: considérations—Suture du sciatique, résultat éloigné—Dr. Rhéaume.

*Hopital Notre Dame
Seance du 12 mai.*

(a) Technique opératoire dans les suppurations pelviennes, (cloisonnement du bassin)—(b) Examen d'une malade—L. de L. Harwood.

Un cas de myxœdème—E. P. Benoit.

Fractures de la colonne vertébrale avec illustrations—O. F. Mercier.

Un cas d'arythmie perpétuelle—Albert Lesage.

(a) Tuberculose rénale (malade et pièce anatomique)—(b) Hémiplégie (membre inférieur); Radiographie; Pièce—T. Parizeau.

Quelques observations sur le diabète—A. Léger.

Quelques cas de pieds bots—B. G. Bourgeois.

Un cas de maladie de peau—Tuberculose cutanée.—Gustave Archambault.

Fracture comminutive ouverte du 1-3 supérieur de l'humérus droit, avec paralysie du radial. Résultats éloignés; Présentation du blessé—Léonidas Blagdon.

Ponction lombaire—Noé Fourneir.

Exposition de plaques radiographiques au département des Rayons X—J. E. Panneton.

*Montreal General Hospital
May 12th, 1922, 2-4 p. m.*

Splenomedullary Leukaemia—H. A. Lafleur.

Heart Block—A. A. Robertson.

Banti's Disease—C. A. Peters.

Femoral Thrombosis and Pulmonary Embolism—J. A. Hutchison.

Pneumopericardium—A. T. Bazin.

Fracture of Sacrum—Fracture of Great Trochanter—F. J. Tees.

Treatment of Infected Open Pneumothorax—F. B. Gurd.

Carcinoma of Lip—W. L. Barlow.

Recent Methods of Intracranial Diagnosis—C. K. P. Henry.

Tuberculous Infection of Foot—A. R. Pennoyer.

Acidosis—M. Rabinovitch.

1. Vaginal Hysterectomy: (a) Adenoma-Carcinoma of body; (b) Polypoid Endometritis (specimen)—H. M. Little.

2. Interposition Operation for Prolapse—H. M. Little.

The Bronchoscopic Treatment of Pulmonary Abscess—R. P. Wright.

The Surgical Treatment of Paralytic Club Foot—J. A. Nutter.

Osteo-myelitis and General Septicæmia—A. M. Forbes.

Eye Symptoms in Graves' Disease—S. H. McKee.

Papilloma of Renal Pelvis—F. S. Patch.

X-Ray Demonstration—W. A. Wilkins.

Thyroidectomy under Local Anæsthesia—E. M. Eberts.

Lantern Demonstration of Skin Diseases—G. G. Campbell.

Demonstration of Fracture Cases—F. J. Tees and F. B. Gurd.

Inspection of Pathological Laboratories—L. J. Rheau.

ONTARIO

THE CHIROPRACTIC BILL THROWN OUT.—No better demonstration of what organized effort can do, will ever be shown, than is evident in the fate of this Bill brought before the Private Bills Committee on April 11th. In this connection, the efforts of the President, Dr. Farley, the Secretary, Dr. T. C. Routley, and of Dr. E. E. King, Chairman of the Joint Advisory Committee, must be especially commended, for, if this Bill had gone through, it can be safely said that Chiropractic would have been landed on a firm footing in the Province. The Bill as read was "an Act to incorporate the Canadian College of Chiropractic, Limited; to establish, and maintain the necessary place and equipment for the purpose of carrying on a College, branch colleges, publishing text books, giving lectures and concerts and moving picture exhibitions, and the granting of diplomas; and, furthermore, to establish, maintain, and conduct sanatoria and hospitals in connection with the said college, for the practice of Chiropractic and for the conducting of clinics, public and private."

It can be pointed out that, if the Government grants permission to the Chiropractors to establish hospitals and sanatoria, it is but a short step to permitting them to enter and practice in the various hospitals and sanatoria at present established; and, secondly, that, if this charter were granted, it legalizes the practice of Chiropractic in the province. The profession was represented by

a large delegation representing the various universities and provincial organizations.

The thanks of the profession are owing to Dr. Forbes Godfrey and other members of the House for their adroit questioning of Dr. DuVal who was present as representing the Chiropractors. As a result of their inquiries, the impropriety of the Chiropractic claims was made only too evident, and the members of the Private Bills Committee in throwing out the Bill informed the Attorney General that further information from the physicians representing the medical profession was quite unnecessary.

The Medical Society of Port Arthur met on April 1st. Dr. Geo. Strathy, of Toronto, gave a lecture at 2:00 p. m. on "Pain in the Back," and at 9:00 p. m. on "Arteriosclerosis." In the morning Dr. Strathy gave clinics at McKellar Hospital, and there were clinics at St. Josephs and Port Arthur General Hospital in the afternoon.

The Western Ontario Academy of Medicine met on Tuesday, April 18th, in the Medical School Auditorium. Addresses were given by Dr. John Oille, of Toronto, on "High Blood Pressure and Arteriosclerosis"; by Dr. Anthony Bassler, of New York, on "Splanchnoptosis," and the programme closed with a gastro-enterological clinic.

GENERAL

SPECIAL

By an unfortunate oversight two well written obituaries, one upon Dr. George Bingham and the other upon Dr. George Elliott in the April issue, appeared without the initials of the contributors. By special request, Dr. H. B. Anderson, of Toronto, had undertaken that of Dr. Bingham and the style and diction thereof show well

the intimate knowledge the writer had of the life he was handling and the care he had taken to produce an appealing personal description of Dr. Bingham.

Dr. J. N. E. Brown, of Toronto, contributed the very delightful sketch of Dr. Elliott to one of the Academy evenings in Toronto and we are indebted to him for the permission to reproduce it. The Journal apologizes to Dr. Anderson and to Dr. Brown for the omission.

Obituary

DR. FREDERICK A. RAND

DR. FREDERICK A. RAND, of Parrsboro, N. S., died at his home, April 25th, 1921, of heart failure, following over-exertion. He was born in Canning, N. S., in 1855. He studied medicine at Dalhousie Medical College and the University of New York. He was a leading citizen, and for six years was the town's Chief Magistrate. He was Coroner for that section of the county for 30 years. He has in recent years attended to his private business and has not been in active practice.

JOHN MOODY BINGAY

DR. JOHN MOODY BINGAY, one of the oldest medical practitioners in the Maritime Provinces, died at the home of his son in Glace Bay, on Friday, March 31st, 1922.

Dr. Bingay was born at Tusket, Yarmouth Co., on November 30th, 1836. In his early youth he removed to St. John, N. B., where he spent several years, including that of the great cholera epidemic of 1854. In 1860 he entered Harvard University from which he graduated in 1862 having by his industry, and hard work completed a course in two years, which usually required three. After graduation, Dr. Bingay returned to his native land, and

settled in Tusket where, and in the surrounding districts, he practised his profession for fifty years, retiring in 1912.

A quotation from a Yarmouth paper at the time of his death indicates the esteem in which he was held: "In his profession he was most thorough in all things, and as a physician he was very widely known to many persons throughout western Nova Scotia. Dr. Bingay possessed a very benevolent disposition, and his kindly attention to many patients, particularly those of straightened or adverse circumstances, will hold him in loving memory for many years to come."

DR. GEORGE BINGHAM

DR. GEORGE SHELDON BINGHAM died on April 6th, in Hamilton, in his seventy-first year. He was a native of Kitchener, the son of Dr. G. W. Bingham and Mary H. Bingham. He graduated in 1881, from Victoria University, practised first in Waterloo, and for the last forty years in Hamilton.

DR. ALBERT KINZEY, who had been practising at Hearst, Ontario, died at Gravenhurst on April, the twenty-ninth, aged thirty-five years.

Book Reviews

International Clinics. Thirty-first series, vol. IV, 1921. Edited by H. R. M. Landis, M.D., Philadelphia, U. S. A., with Medical and Surgical Collaborators in United States, England and Canada. J. B. Lippincott Company, Montreal, Que. Price, \$2.50 per volume or \$10.00 for the series of four.

The final volume of this series completes a most excellent year's presentation of papers in the various departments of medicine and surgery. The papers in industrial medicine continue to be of outstanding merit. In addition to practical suggestions in the treatment of fractures and of stiff joints, there is a splendid article on "Workman's Backache." The surgical papers on the large bowel and pelvic surgery are well written and have excellent illustrations. Babcock's paper on the management of dyspnea of circulatory origin is an outstanding contribution among several medical papers of great interest and clinical value. The volume closes with a good article on the coefficient of safety in general anaesthesia.

J. H. E.

Exophthalmic Goitre. WALTER EDMUNDS, M.A. M.Ch., F.R.C.S., London. Demy 8vo, 36 pages, 4 plates. London, Bailliere, Tindall and Cox, 1921. Price, 3/6.

THIS small volume is a reprint of a lecture delivered at the North-East London Post-Graduate College in April 1921. It is a short sketch, historical, anatomical and philosophical; pleasant reading, but not a practical treatise. It is thought provoking rather than conclusive.

J. H. E.

Medical and Surgical Reports of the Episcopal Hospital. Volume V.—Edited by Astley P. C. Ashhurst, M.D. 498 pages, 162 illustrations. Philadelphia, Press of Wm. J. Doran, 1920.

THIS volume of reports contains contributions by members of the staff based upon work done in the hospital during the years 1916-1920. The publication has been made possible through the establishment of a special fund by a generous friend of the hospital. The editor is to be congratulated upon his work. The pages are well written and the illustrations excellent. Drawings, photographs and radiograms are all well reproduced. Many of the articles have appeared in journals and are reprinted, others have not been published previously. The quality of the work done in a hospital cannot but be influenced by the development of care and enthusiasm stimulated by such a volume of reports.

J. H. E.

Protein Therapy and Non-Specific Resistance—WILLIAM F. PETERSEN, M.D., Associate in Pathology, University of Illinois. With an introduction by Joseph L. Miller, M.D., Professor of Medicine, Rush Medical College. 314 pages, vol. XVII. New York, 1922. The McMillan Company. Price, \$4.50.

In all times and in all lands physicians have sought an explanation for the observed fact that some individuals are resistant to infectious disease and some are not, that with the same infection one man may recover and another may die. With the discovery of the relation of bacteria to disease the trend of thought was along the lines of specific bodies and specific resistance. This particularly followed the brilliant work of Von Behring and Roux. We have been inclined to mark the progress of therapy during the past thirty years by the measure of success achieved in the production of specific immunizing agents. For the past seven years, however, there has been a growing literature on the subject of the non-specific character of vaccine therapy and other forms of protein therapy.

Clinical reports are numerous on the results of treatment of disease by non-specific agents which may give either general reaction, or focal reaction in the disease area, or both general and focal reaction. The author who for a number of years has been studying the process of immunity, has brought together the clinical results so far reported. He makes little attempt to criticise or evaluate, but rather to tabulate. For example, under carcinoma he notes the reports of the use of serum albumin, ovalbumin, convalescent serum, normal horse serum, milk intramuscularly, trypsin, tumour autolysates and other substances. Their use is followed by a period of malaise and fever for several days and then for a time a general improvement in the condition of the patient, with gain in weight, better appetite, lessened pain, and at times decided regressive changes in the tumour.

The theories of the mechanism of the reaction of the body tissues to foreign protein are discussed and all the diseases to which such treatment has been applied are considered.

The author is not prepared to state definitely that he believes that non-specific resistance and non-specific immunity are of greater importance to the organism than are the specific forces. He retains an open mind. No conclusions are reached though it is evident that the evidence presented has influenced the author to believe there is a future for non-specific therapy. His bibliography contains some eleven hundred titles arranged alphabetically by authors.

J. H. E.

How to be Useful and Happy from Sixty to Ninety—

A. LAPHORN SMITH, B.A., M.D., M.R.C.S., with a foreword by Sir Charters Symonds, M.D., M.S., F.R.C.S., K.B.E., C.B. Publishers, John Lane, the Bodley Head, Limited, London, 1922. Octavo, cloth, 5 shillings.

No good Canadian should die without having perused this volume; and, to be Irish, he probably won't die if he does. Anyone who can remember the author and the many long illnesses through which he went, and the acute collapse which looked to be the end of his life, can only marvel at the resurrection which this book seems to indicate. Dr. Smith's early life in Montreal, a life full of activities, an active existence in the west, a complete uprooting at the time of the war and a transplanting into army life and English civil practice would seem to mean that his life demonstrates the possibility of applying the principles set forth so interestingly in his book. To have produced at his age such a readable volume is an example to one and all of us and the publication is assured already of popular favour.

N. G. B.

Annual Report of the Surgeon General of the Public Health Service of the United States for the fiscal year 1921.—Treasury Department, A. W. Mellon, Secretary. Washington, Government Printing Office. Quarto, 425 pages.

An interesting review of the many problems which are occupying the public health service of the United States. Such things as malaria control, investigations into the cause of pellagra, botulism, leprosy, anthrax, hookworm disease, plague, are all considered from a public service standpoint. Child Hygiene, industrial medicine, is reviewed. Questions of quarantine, destruction of rodents are given interesting chapters. It is interesting to note that in the lead industries, fifteen per cent. of the workers show poisoning to a greater or less degree. A large section of the book is given up to the division of Marine Hospitals and relief.

N. G. B.

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Books Received

Tuberculosis in Infancy and Childhood—Lectures delivered at the Children's Hospital, Philadelphia, under the auspices of the Philadelphia Pediatric Society. By J. Claxton Gittings, M.D., Frank Crozer Knowles, M.D., and Astley P. C. Ashurst M.D., with 23 illustrations. Published by J. B. Lippincott Co., 201 Unity Bldg., Montreal. Price, \$5.00.

The Surgical Treatment of Non-Malignant Affections of the Stomach—By Charles Greene Cumston, M.D., and Georges Patry, M.D., with an introduction by Sir Berkeley G. A. Moynihan, K.C.M.G., G.B., M.S. Published by J. B. Lippincott Company, 201 Unity Bldg., Montreal. Price, \$5.00.

Practical Infant Feeding—By Lewis Webb Hill, M.D. Octavo of 483 pages, illustrated. W. B. Saunders Co., Philadelphia and London and J. F. Hartz Co., Limited, Toronto. Price, \$5.50.

L'Hypertension Arterielle—By Maurice Perrin, M.D., and Gabriel Richard, M.D. Published by J. B. Bailliere and Sons, 19 Rue Hautefeuille, Paris, 1922.

The Intensive Treatment of Syphilis and Locomotor Ataxia by Aachen Methods (with notes on Salvarsan).—By Reginald Hayes, M.R.C.S., fourth edition, revised; 99 pages, 4 plates, price, 4/6. Published by Bailliere, Tindall and Cox, 8 Henrietta Street, Covent Garden, London, 1922.

Surgical and Mechanical Treatment of Peripheral Nerves—By Byron Stookey, A.M., M.D., with a chapter on Nerve Degeneration and Regeneration, by G. Carl Huber, M.D., 270 illustrations, eight in colour, and 20 charts. Price, \$10.50. Published by W. B. Saunders Company, Philadelphia. J. F. Hartz Co., Ltd., Toronto, Canadian agents.

A Form of Record for Hospital Social Work, including suggestions on organization.—By Gertrude L. Farmer. 81 pages. Price, \$1.50. Published by J. B. Lippincott Company, 201 Unity Bldg., Montreal.

Artificial Limbs and Amputation Stumps—A practical handbook, by E. Muirhead Little, F.R.C.S. (Eng.) with 267 illustrations, 319 pages, price 18 shillings net. Published by H. K. Lewis and Co., Ltd., 28 Gower Place, London, W. C.

Pneumothorax caused by Foreign Body Swallowed.—A. F., age 14 on Aug. 7, 1921, accidentally swallowed a Canadian cent. When seen about six hours later, he swallowed freely water and food, and made no complaint. Forty-eight hours later he complained of some diffuse pains in his chest and an X-ray examination showed that the coin was lodged in the oesophagus at the diaphragmatic level. Under anaesthesia an unsuccessful attempt was made to extract it, and it was believed that the coin had been shoved into the stomach. The following afternoon temperature and respiration were elevated and the patient appeared anxious and very worried. The following day some fine crepitations appeared at the right base and twenty-four hours later a right-sided pneumothorax was definitely made out. After several days a large aspirating needle was put into the right thorax and turbid fluid was withdrawn with particles of what appeared to be orange shreds and all having the odor of butter-milk. Laboratory examination showed lactic acid and no HCL. Conclusion was that the oesophagus communicated with the right pleural cavity. Under local anaesthesia a tube was inserted into the right pleural cavity and a considerable amount of the same material escaped. Food, etc., continued to drain from the tube. He continued ill for a month and on September 8, he passed the

coin per rectum. On two occasions up to that time, fluoroscopic examination showed the coin to be still in the oesophagus and showed the results on the left chest, of the right-sided pneumothorax. From the passing of the coin improvement began and in three weeks food discontinued to appear in the drainage and the lung came down to the level of the 3rd rib in front and breath sounds began to appear again. On Nov. 1, he was discharged from the hospital still wearing the tube and showing some flattening of the right chest. The communication between the oesophagus and the pleural cavity has remained closed. The chest now shows a marked degree of flattening on the right side. Beyond the fact that the right thorax is still draining and he wears a tube, he feels normal.—F. R. Clegg, M.D.

Deterioration of Non-Arsphenamin.—Commercial neo-arsphenamin, GEORGE B. ROTH, Cleveland (Journal A. M. A., April 22, 1922), states is a relatively unstable substance in the ampule. Temperature is a potent factor in causing its deterioration. It is advisable to keep it under storage conditions similar to those required for vaccines, that is, at icebox temperatures, until all the factors concerned in causing the deterioration of the compound are understood.

